2003 LONG-TERM ECONOMIC AND LABOR FORCE FORECAST FOR WASHINGTON

JUNE 2003

Contents

EXECUTIVE SUMMARY 1

Population 1
Labor Force 2
Employment 2
Personal Income 2

CHAPTER 1
LONG-TERM FORECASTS OF WASHINGTON POPULATION AND NET MIGRATION 3

Net Migration 4
Forecast of Net Migration 6
Natural Increase 8

CHAPTER 2
LONG-TERM FORECAST OF THE WASHINGTON LABOR FORCE 13

Population Change and Labor Force Growth 15
  Migration 16
Changes in Labor Force Participation 17
  Male Labor Force Participation 18
  Female Labor Force Participation 21
Forecast of Total Labor Force 23
The Changing Profile: Aging, Female, and Non-White Workforce 24
  Higher Proportion of Women in the Labor Force 24
  Aging of Labor Force 25
  Non-White and Hispanic Workforce 27

CHAPTER 3
LONG-TERM FORECAST OF WASHINGTON WAGE AND SALARY EMPLOYMENT 31

Long-Term Employment Trends 33
Goods-Producing Employment 33
  Lumber and Wood Products 36
  Paper and Allied Products 37
  Aerospace 37
  Other Transportation Equipment 38
  Primary Metals 38
  Machinery and Instruments 39
  Food Processing 40

Construction 41
Service-Producing Employment 42
Transportation, Communication, and Utilities (T.C.U.) 42
Wholesale Trade 43
Retail Trade 43
Finance, Insurance, and Real Estate (F.I.R.E.) 46
Services 46
State and Local Government 48
Federal Government 48
Employment Diversity 48

CHAPTER 4
LONG-TERM FORECAST OF WASHINGTON PERSONAL INCOME 51
Total Personal Income Trends 51
Income Growth by Component 53
Per Capita Income Trends 55
Outlook for Personal Income Growth in Washington 58
Per Capita Income Growth Trend 59
Special Analysis: Trends in Earnings 61
Changes in Real Average Earnings in Washington, 1979-2001 62
Real Average Earnings Decline in Washington, 1979-88 64
Rebound in Washington Real Average Earnings, 1988-2001 65
Some Explanations for the Earnings Changes 65
Appendix 4-A: Decomposition of Average Earnings 67

TABLES

Table 1-1. Components of Population Change: 1980-2027 11
Table 2-1. Washington Labor Force by Age and Sex, 1990 and 2027 18
Table 2-2. Elderly Labor Force Participation and Education: Washington, 2000 20
Table 2-3. Washington Labor Force Change 23
Table 2-4. Washington Labor Force: Historical and Forecast 26
Table 2-5. Labor Force Composition by Race: Washington 28
Table 3-1. Washington Labor Force and Employment 32
Table 3-2. Washington Non-Agricultural Wage and Salary Employment by Industry 34
Table 3-3. Percent Share of Total Non-Agricultural Wage and Salary Employment by Industry 44
Table 4-1. Real Income Growth by Component: Washington 53
Table 4-2. Growth in Real Earnings by Industry: Washington 54
Table 4-3. Personal Income Trends: Washington and U.S. 60
Table 4-4. Washington Real Average Earnings: Components of Change (1979-88) 64
Table 4-5. Washington Real Average Earnings: Components of Change (1988-2001) 65

FIGURES

Figure 1-1. Components of Population Change: Washington 3
Figure 1-2. Population Growth: Washington, 1970-2027 4
Figure 1-3. Net Migration and Traded Sectors Employment Change 5
Figure 1-4. Net Migration and Population Change 7
Figure 1-5. Births and the Total Fertility Rate: Washington 8
Figure 1-6. Aging of Population: Washington 10
Figure 2-1. Washington Labor Force Growth 13
Figure 2-2. Population Estimates and Forecasts for Ages 16-24 15
Figure 2-3. Population Estimates and Forecasts for Ages 25-54 16
Figure 2-4a. Washington Male Labor Force Participation Rates (Age 16-64) 19
Figure 2-4b. Washington Male Labor Force Participation Rate (Age 65+) 20
Figure 2-5. Washington Female Labor Force Participation Rates 22
Figure 2-6. Forecast of Washington Labor Force Participation Rates by Sex 22
Figure 2-7. Forecast of Washington Labor Force Distribution by Sex 24
Figure 2-8. Age Profile of Washington Labor Force 25
Figure 3-1. Washington Total Non-Agricultural Wage and Salary Employment 31
Figure 3-2. Manufacturing Employment Trends: Washington and U.S. 35
Figure 3-3. Share of Total Washington Non-Agricultural Employment: Lumber and Paper Industries 36
Figure 3-4. Relative Growth in Construction and Total Non-Agricultural Employment 41
Figure 3-5. Relative Growth in Trade and Total Non-Agricultural Employment 45
Figure 3-6. Employment Growth: Total Non-Agriculture, Services, and Traded Services 47
Figure 3-7. Distribution of Washington Employment by Industry 50
Figure 4-1. Total Personal Income: Washington, 1970-2026 52
Figure 4-2. Annual Change in Total Real Personal Income 52
Figure 4-3. Elderly Population and Retirement-Related Payments 55
Figure 4-4. Annual Changes in Real Per Capita Income 56
Figure 4-5. Ratio of Washington to U.S. Per Capita Income 58
Figure 4-6. Real Per Capita Income Growth 61
Figure 4-7. Real Average Earnings: Washington vs. U.S. 62

Executive Summary

THIS ANNUAL PUBLICATION contains long-term population, labor force, employment, and personal income projections for Washington State. The Office of Financial Management (OFM), Forecasting Division, and the Employment Security Department, Labor Market and Economic Analysis Branch jointly prepare the labor force and employment projections. The forecast horizon extends from 2002 to 2027. The medium-term forecast for the 2002-2005 period is consistent with the February 2003 Economic and Revenue Forecast Council official state economic forecast.

The 2001 national recession is a production-side recession, led by the bursts of business capital investment and equity market bubbles; while consumer spending and housing remain healthy. The recovery is expected to be a slow and weak one, because many factors that traditionally lead the recovery, such as housing, sales of consumer durable goods, and lower interest rates were not significantly affected by this recession and thus cannot provide much stimulus needed for a vigorous rebound. In addition, the recovery was disrupted by the 2003 Iraq war. On the production side, low capacity utilization rates and slow improvement in corporate profits had delayed a significant pickup in business capital investment until the second quarter of 2003.

Washington Population, Labor Force, Employment, and Income

	Population (1,000)	Labor Force (1,000)	Employment (1,000)	Per Capita Income (1996$)
1970	3,413	1,417	1,080	14,999
1980	4,132	1,985	1,609	19,695
1990	4,867	2,537	2,142	23,270
2000	5,894	3,045	2,711	29,371
2010	6,650	3,489	3,025	34,207
2020	7,547	3,895	3,449	41,908
2027	8,139	4,178	3,707	47,621

Population

- **Washington's population will increase 35 percent by the year 2027.** In 2002, about 6.0 million people lived in the state. The state population is expected to increase 2.1 million over the next two decades, reaching 8.1 million by 2027.
- **Aging of the population will be the most important demographic phenomenon in the next few decades.** In 2002, 11.2 percent of the Washington population was age 65 and over. By 2027, this age group is projected to account for 18.8 percent of total state residents. Most of the increase in the elderly population will take place after 2010, when the Baby Boom generation starts entering this age group.

Labor Force

- **Washington's total labor force will increase 37 percent between 2002 and 2027.** This amounts to a gain of 1.13 million workers, from 3.05 million in 2002 to 4.18 million by 2027.
- **The labor force participation rate will be about the same in 2027 as it is today.** In 2002, the labor force participation rate in Washington was 66.4 percent; the rate is projected at 66.5 percent by 2027. After 2010, the Baby Boom generation will start entering into retirement age and leaving the labor force; this negative effect on labor supply will be offset by the trends of delayed retiring and continuing increase in female labor force participation.
- **Washington's labor force will become more diversified in terms of age, sex, racial, and ethnic compositions.** By 2027, 48 percent of the state labor force will be female; workers over age 55 will represent about 20 percent of all state workers, substantially higher than the 13 percent share in 2002. Share of non-white workers in the state labor force is expected to rise from 12.7 percent in 2002 to 15.5 percent in 2027.

Employment

- **Between 2002 and 2027, 1.05 million non-farm jobs will be added to the Washington economy.** Employment in the state is expected to increase at an average annual rate of 1.3 percent over the next 25 years, from 2.65 million in 2002 to 3.71 million by 2027.
- **Most of the projected employment growth will be in retail and services industries.** From 2002 to 2027, trade and services are predicted to account for about two-thirds of total job increase in the state. Employment in the goods-producing sectors (i.e., manufacturing, mining, and construction) will increase moderately due mainly to the anticipated productivity growth; by 2027, these sectors will account for only 14.8 percent of total jobs in the state.
- **Washington's economy will become increasingly diversified.** For decades, state employment was highly concentrated in defense, aerospace, and timber industries. Booms and busts in these industries likely would induce the same conditions in the overall state economy. The growing importance of trade and services employment in the future will lead to a more diversified and stable economic growth for the state.

Personal Income

- **Washington's total personal income will increase 126 percent between 2002 and 2027.** In 1996 dollars, total personal income in Washington amounted to $178.5 billion in 2002, and is projected to reach $403.4 billion by 2027.
- **Per capita income in Washington will remain above the national average.** In 2002, per capita income in the state was estimated at $32,747, 2.6 percent above the national average. The projected state per capita income in 2027 will be, inflation adjusted, 68 percent higher than the 2002 level, and 0.9 percent above the forecasted national average.

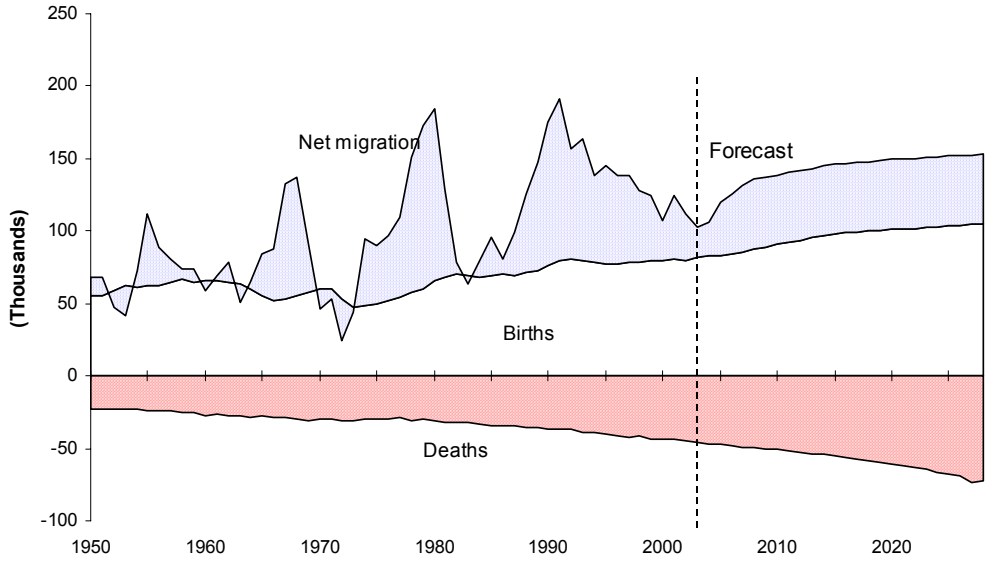
CHAPTER 1

Long-Term Forecasts of Washington Population and Net Migration

POPULATION PROJECTION is an integral part of the long-term forecast for Washington labor force, employment, and income. Population growth contributes to economic growth in the state by making available the labor needed for production and by increasing the demand for goods and services.

Long-term population growth results from the combined effects of two sources of change: natural increase and net migration. Natural increase is the excess of births over deaths, and net migration is the difference between in-migration and out-migration.

Figure 1-1
Components of Population Change: Washington

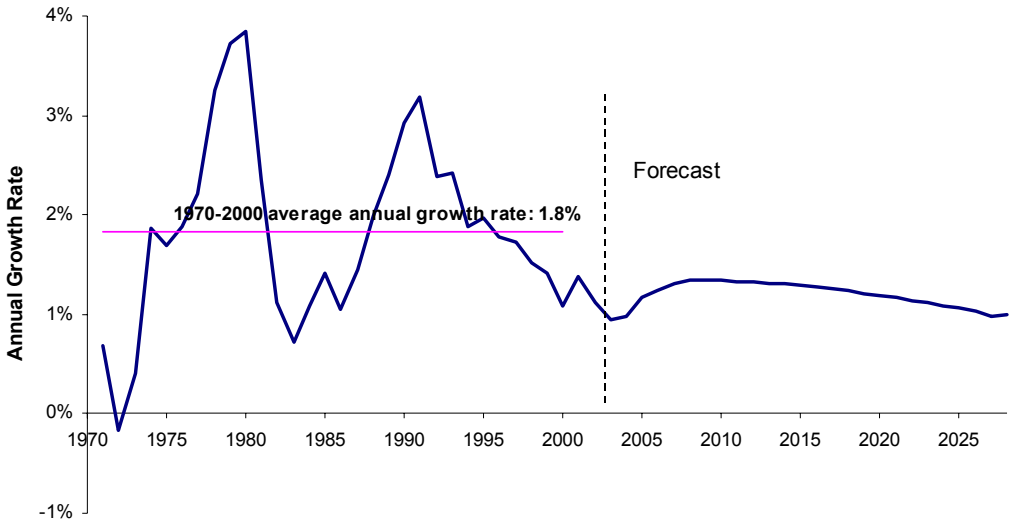


OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division **APRIL 2003**

Between 1970 and 2002, population in Washington grew 77 percent from 3.4 to 6.0 million, averaging 1.8 percent per year. However, the year-over-year changes fluctuated widely, ranging from a high of 3.8 percent in the 1979-80 period to the 1971-72 low of negative 0.2 percent. Net migration, which responds to changing economic conditions, accounted for most of the ups and downs in the yearly state population figures (Figure 1-1). Change in the number of births over time depends on the growth, age structure, and fertility rate of the woman population. In the long run, trend of births in Washington reflects long, generational waves of socioeconomic change including the Great Depression, the post World War II baby boom, the baby bust of the 1970s, and the baby boom echo of the 1980s.

Washington population grew steadily in the second half of the 1980s and peaked in 1990. Between 1990 and 1993, the state population growth remained high at a 2.8 percent annual rate. For the rest of the decade, however, the state population growth slowed to 1.6 percent per year. By 2002, about 6.0 million people lived in Washington State. Over the next 25 years, the state population is expected to grow at an annual rate of 1.2 percent (Figure 1-2), reaching a total of 8.2 million by the year 2027. Net migration will continue to play a major role in the state population growth.

Figure 1-2
Population Growth: Washington, 1970-2026



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division APRIL 2003

Net Migration

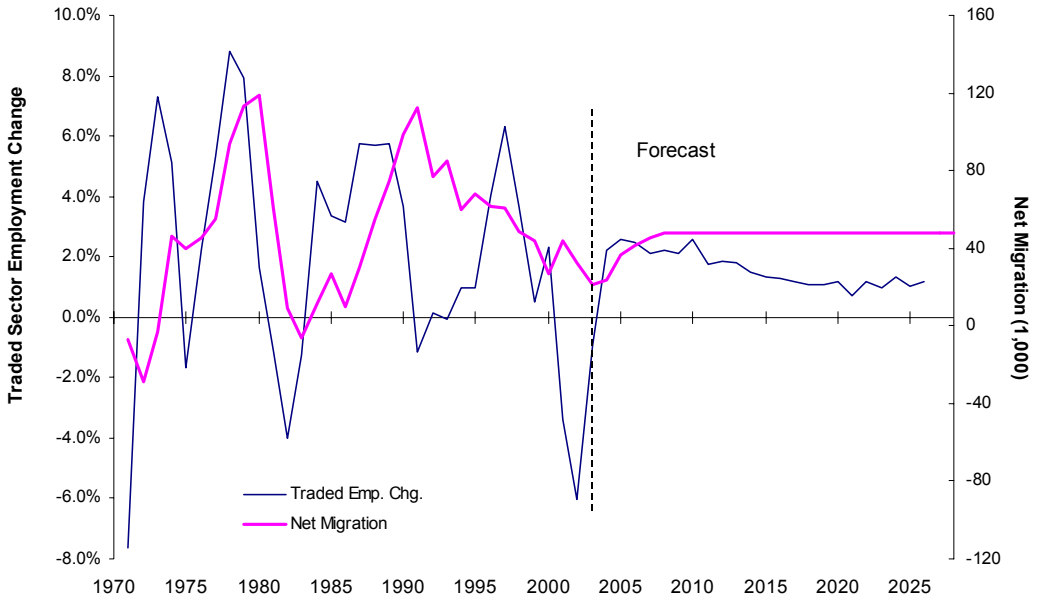
People move into or out of Washington for a variety of reasons. Non-economic factors such as movements of military personnel, retirement migration (principally persons over age 65), and pursuit of social and natural amenities account for only a small portion of net migration. The majority of interstate population movements are due to relative changes in the labor market and economic conditions among the states. An expanding economy and labor market tends to "pull" people into an area. Conversely, a contracting economy and labor market tends to "push" people out of it. Net migration is the difference between out-migration and in-migration. These "push" and "pull" factors have made net migration the major contributor to population change in Washington.

The effects of the "push" and "pull" factors are evident in the historical pattern of the state's net migration. For example, large net migration occurred as a result of rapid economic expansions in Washington during the late 1970s and again in the late 1980s. When the state economy slumped in 1970-73 and 1981-83, net migration dropped sharply; in several of those years there was actually negative net migration.

In the first half of the 1990s, the slowing of economic growth in the state lowered the level of net migration and thus restrained population growth, but not to the same extent as in the past. One major reason is that employment growth in Washington still remained in positive territory during the 1990-91 national recession. This made Washington relatively more attractive, compared to other states that were losing employment, to those who were seeking jobs. The relative strength of the Washington economy compared to the rest of the U.S. helped "pull" more job seekers into the state. In addition, the California economy, which experienced a steep employment decline starting about the same time as the U.S. recession, remained depressed well into 1993. Even though Washington experienced a significant reduction in aerospace jobs beginning in 1991, the overall Washington economy continued to perform much better than California. Between 1990 and 1994, California experienced a net out-migration of over 400,000 persons per year. Washington received a significant amount of these Californian out-migrants. These two factors, among others, contributed to fairly high levels of net migration for Washington during the early 1990s, even when the state's economy slowed down significantly.

The picture, however, has reversed in the next five years. From 1995 to 2000, while state economic growth picked up pace, so did the U.S. and the Californian economies. As a result, the level of net migration dropped steadily (Figure 1-3).

Figure 1-3
Net Migration and Traded Sectors Employment Change



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division **APRIL 2003**

Change in the "traded sector" employment has been a major determinant of the Washington net migration. The traded sectors of the state economy include manufacturing, civilian federal government, and producer services (services purchased by other businesses and government

agencies). These industries are considered "traded" because they bring revenue and income into the state. For example, most of the software products produced in Washington are sold to businesses and consumer outside the state.

The traded industries usually demand special worker skills that cannot be sufficiently supplied from the local labor pool. Companies in the traded sectors thus constantly recruit workers, especially professionals, from the national labor market. During expansionary periods, new jobs created in the state's traded industries very likely require specialized skills or experience that are in short supply among existing Washington worker pool. For example, to increase development and production to the desired levels, the aerospace industry may require as many as 3,000 additional engineers in a single year. If this amount of extra engineers is not readily available in the state, they will have to come from elsewhere in the country or even from overseas.

Traded sector also tend to provide high-wage jobs, which is another incentive to attract workers from outside the state. High wages not only induce people to change jobs, they also help cover the costs of interstate relocation. Cost is a critical concern especially if in-migrating workers need to bring family members with them. In short, when Washington's traded sectors expand, net migration increases, and when these sectors decline net migration falls.

Net migration has a significant impact on the size of the state labor force. Since a majority of in-migration to Washington is associated with employment opportunities, these economic migrants tend to be active labor market participants for a long span of time, therefore contributing to the growth of the labor force. Also, gross (i.e., in- plus out-) flow of migration is generally 5 to 10 times the magnitude of net migration; this is the reason why many public and private business operations (e.g., issuance of driver's license, rental housing, etc.) are strongly affected by the level of net migration.

Forecast of Net Migration

The methodology used to forecast net migration includes two steps. First, the Office of Financial Management (OFM) and the Employment Security Department (ESD) jointly develop a forecast of employment for the traded sectors. This initial forecast is based on a system of equations determining employment in each of the 17 manufacturing sectors, the federal civilian sector, and the producer services sector. The producer services sector consists of business services, legal services, engineering, accounting, research, management, and related services.

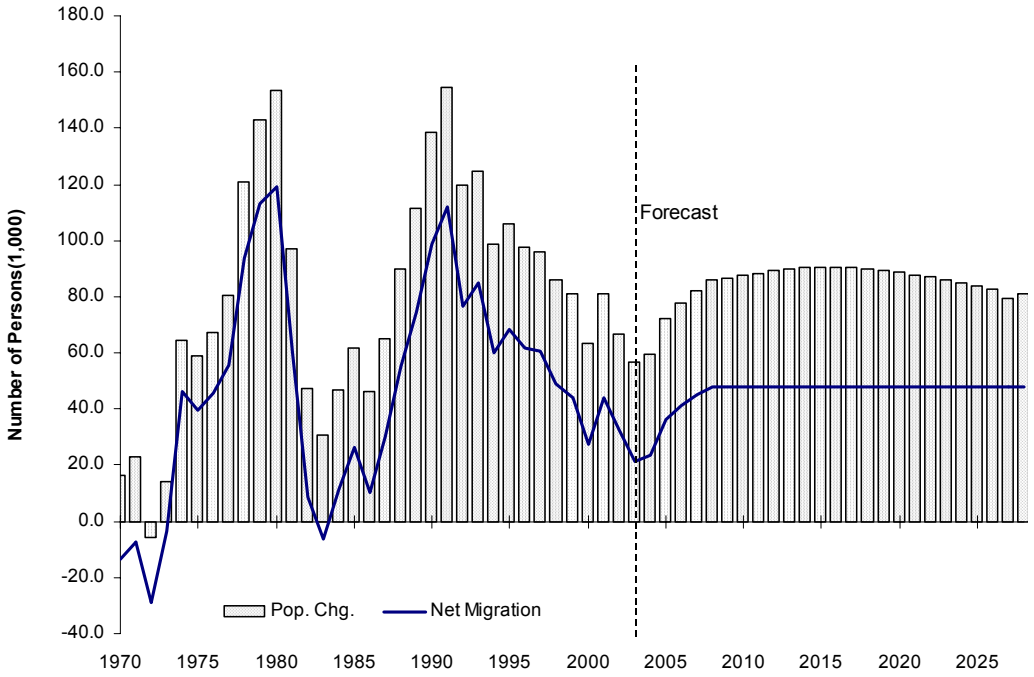
Next, a single equation model is developed which treats Washington net migration as a function of traded sector job growth within the state relative to economic conditions in the rest of the country and in California. The specific factors included in the model to determine levels of Washington net migration are:

- **Percentage change in Washington's traded sector employment relative to percentage change in the U.S traded sector employment.** (The U.S. forecast was from Global Insight Summer 2002 long-term trend forecast.)

- **Percentage change in Washington's traded sector employment relative to percentage change in California traded sector employment.** (The California forecast was obtained from the Global Insight's Regional Services.)
- **The national unemployment rate.**

Net migration for Washington over the next 25 years is predicted to maintain an average of about 45,500 persons per year, about the same as the historical average of 44,100 per year between 1970 and 2002. The level of net migration, however, varies over the forecast period. Net migration is predicted to remain low during 2002-05, and then gradually increase to settle on a stable, long-term level of around 48,100 per year through 2027. (Population statistics, including net migration, are shown in Table 1-1 at the end of this chapter.)

Figure 1-4
Net Migration and Population Change



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division APRIL 2003

The main reason that Washington's net migration is expected to sustain at the historical average is that Washington's traded sectors are expected to maintain healthier growth than their national counterparts over the forecast period. For example, the forecast calls for manufacturing employment to grow modestly in Washington over the next 25 years, whereas manufacturing employment in the U.S. is projected to gradually decline.

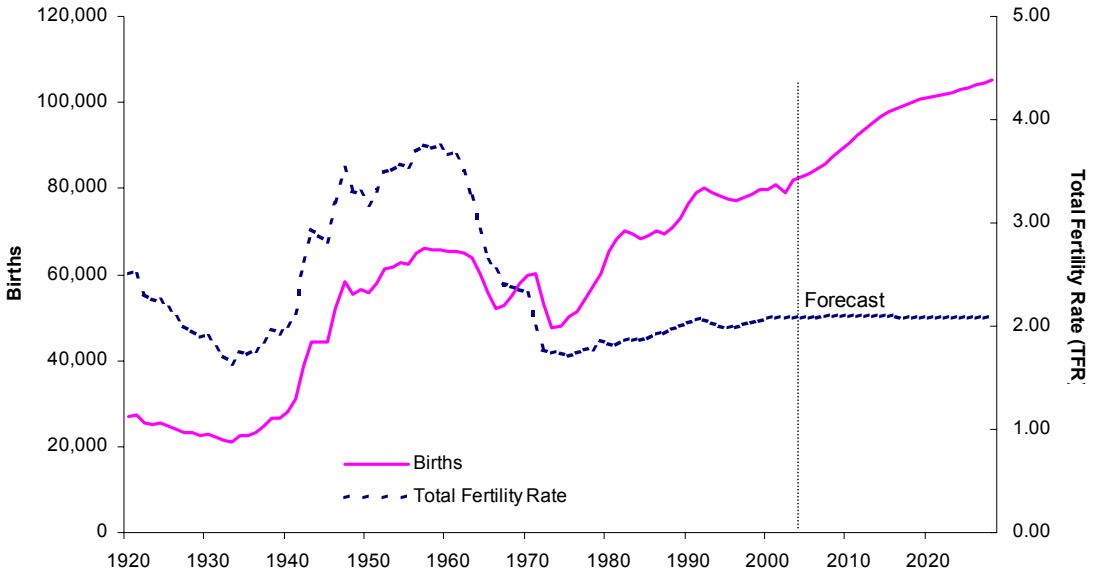
The net migration forecast, once completed, is incorporated in the demographic model for the long-term projection of state total population.

Natural Increase

Natural increase is the second component of population growth. Natural changes include additions to the population through births, and reductions from the population due to deaths. The state's natural population increase is projected to average 38,000 a year between 2002 and 2027.

Total fertility rate in Washington, which represents the estimated average number of births to women during their childbearing years, is expected to reach and remain at a replacement level of 2.0 births per woman through the end of the forecast period (Figure 1-5). This is somewhat above the all-time low of 1.6 births per woman in 1933, but far below the peak of 3.7 births per woman in 1957. The fertility rate is not expected to rise significantly, in part because of the increasing labor force participation rate for women of childbearing age. (See next chapter.) Also, compared to earlier generations, women are marrying later, having births later, more likely to live independently, and spending more time on education. These factors, in combination with technological advancements in birth control, tend to lower the fertility rate.

Figure 1-5
Births and the Total Fertility Rate: Washington



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division APRIL 2003

While the fertility rate is expected to remain fairly stable throughout the forecast period, the number of women of childbearing age will grow steadily. As a result, the annual number of births in Washington is expected to rise from 79,200 in 2001-02 to about 107,000 in 2026-27.

By definition, the labor force includes only those age 16 and older. Births have a delayed effect on labor force growth, as individuals born today will be potential members of the labor force in 16 years. This implies that recent population changes due to births will affect the labor force in the latter years of the forecast period. For example, anyone born in 2000 will be old enough to enter the labor force in 2016. Similarly, births over the past 16 years are closely associated with the labor force growth in the 2002-2018 period. Although the annual number of births in Washington during the early 1970s dropped to less than 50,000, the number of births rebounded to 70,100 in 1982. By 1990 the annual number of births in the state had increased to 76,400. As explained above, the increased births in the 1980s and 1990s will contribute to the growth of the state workforce over the next two decades.

Mortality, the other component of natural increase, will also rise throughout the forecast period. Life expectancy increased rapidly between 1920 and 1960 and continued to improve through the 1980s, albeit at a much slower pace. Since a lot of improvements in the prevention of infant deaths already have been achieved, future substantial progress in life expectancy at birth is unlikely.

The forecast calls for both male and female life expectancy in Washington to continue improving at a slow but steady rate. As in the nation as a whole, the state's population will be aging. Higher mortality rates associated with an aging population will more than offset the improving life expectancy, leading to rising aggregate death rates. The proportion of all deaths due to deaths of the elderly will increase during the forecast period. This suggests that mortality will not have a major impact on labor force growth in the forecast period, because most of the deaths will occur at ages when individuals are unlikely to be in the labor force.

Over the next few decades, aging of the population, both in the state and throughout the nation, will be a profound demographic phenomenon. In Washington State, people 65 years of age and older will account for a growing share of population, from 11.2 percent in 2000 to 18.8 percent in 2027 (Figure 1-6). The trend will have widespread economic and public policy implications ranging from the expanding demand for personal and health services at the local level to increasing pressure on the federal Social Security and medical insurance programs.

Table 1-1 on page 11 shows the historical and projected Washington population trend, and the components of population change.

Figure 1-6
Aging of Population: Washington

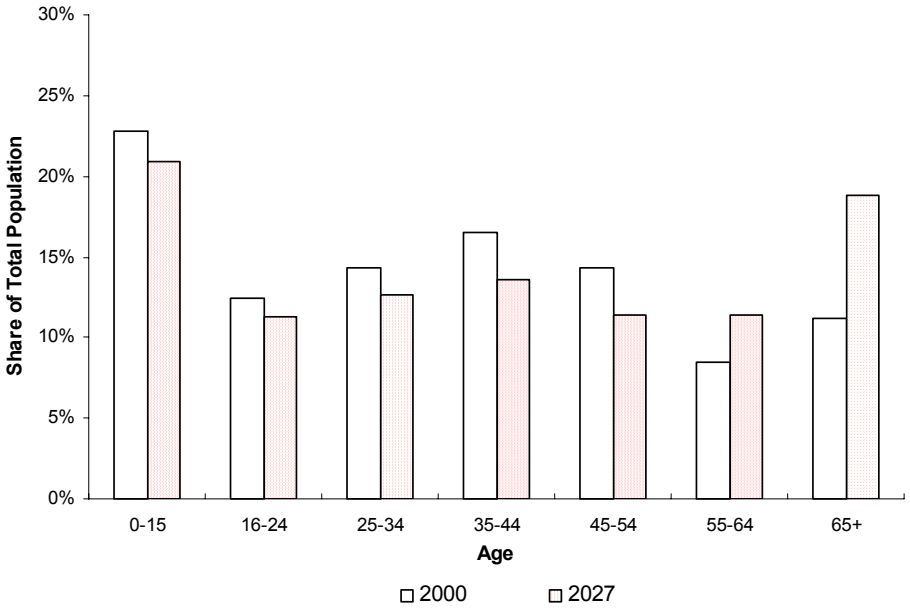


Table 1-1

Components of Population Change: 1990 – 2026

Period	Population End of Period	Population Change Number	Population Change %	Components of Change: Births Number	Births Rate *	Deaths Number	Deaths Rate *	Natural Increase	Net Migration Number	Net Migration Rate *
1989-1990	4,866,700	138,600	2.93	76,400	15.93	36,200	7.55	40,100	98,500	20.53
1990-1991	5,021,300	154,600	3.18	79,100	15.99	36,600	7.40	42,500	112,100	22.68
1991-1992	5,141,200	119,800	2.39	80,200	15.79	37,200	7.31	43,000	76,800	15.11
1992-1993	5,265,700	124,500	2.42	79,100	15.20	39,400	7.56	39,700	84,800	16.29
1993-1994	5,364,300	98,700	1.87	78,200	14.71	39,500	7.44	38,700	60,000	11.29
1994-1995	5,470,100	105,800	1.97	77,500	14.30	40,000	7.38	37,500	68,300	12.60
1995-1996	5,567,800	97,700	1.79	77,000	13.95	41,200	7.46	35,800	61,800	11.20
1996-1997	5,663,800	96,000	1.72	78,000	13.90	42,600	7.59	35,400	60,600	10.79
1997-1998	5,750,000	86,300	1.52	78,800	13.81	41,600	7.28	37,200	49,000	8.59
1998-2000	5,830,800	80,800	1.41	79,800	13.77	43,100	7.45	36,700	44,200	7.63
2000-2000	5,894,100	63,300	1.09	79,900	13.62	43,700	7.46	36,200	27,200	4.64
2000-2001	5,974,900	80,800	1.37	80,700	13.60	43,900	7.40	36,800	44,000	7.41
2001-2002	6,041,700	66,800	1.12	79,200	13.18	44,800	7.46	34,400	32,400	5.40
2002-2003	6,098,600	56,900	0.94	82,000	13.51	46,200	7.61	35,800	21,100	3.48
2003-2004	6,157,900	59,300	0.97	82,600	13.48	46,900	7.65	35,700	23,600	3.85
2004-2005	6,230,000	72,100	1.17	83,400	13.46	47,600	7.69	35,800	36,300	5.86
2005-2006	6,307,400	77,500	1.24	84,400	13.47	48,300	7.70	36,100	41,300	6.59
2006-2007	6,389,500	82,100	1.30	85,800	13.51	48,900	7.71	36,900	45,200	7.12
2007-2008	6,475,300	85,800	1.34	87,400	13.58	49,600	7.72	37,800	48,100	7.48
2008-2009	6,562,100	86,800	1.34	89,000	13.66	50,300	7.72	38,700	48,100	7.38
2009-2010	6,649,800	87,700	1.34	90,600	13.71	51,000	7.72	39,600	48,100	7.28
2010-2011	6,738,200	88,400	1.33	92,100	13.76	51,800	7.74	40,300	48,100	7.19
2011-2012	6,827,500	89,200	1.32	93,700	13.81	52,600	7.75	41,100	48,100	7.09
2012-2013	6,917,300	89,900	1.32	95,200	13.85	53,400	7.77	41,800	48,100	7.00
2013-2014	7,007,800	90,500	1.31	96,700	13.88	54,300	7.80	42,400	48,100	6.91
2014-2015	7,098,500	90,600	1.29	97,700	13.86	55,200	7.83	42,500	48,100	6.82
2015-2016	7,189,000	90,600	1.28	98,600	13.80	56,200	7.86	42,400	48,100	6.73
2016-2017	7,279,300	90,200	1.26	99,300	13.73	57,200	7.90	42,100	48,100	6.65
2017-2018	7,369,100	89,900	1.23	100,000	13.65	58,200	7.95	41,800	48,100	6.57
2018-2019	7,458,500	89,400	1.21	100,600	13.58	59,300	8.01	41,300	48,100	6.49
2019-2020	7,547,300	88,800	1.19	101,200	13.49	60,500	8.07	40,700	48,100	6.41
2020-2021	7,635,100	87,800	1.16	101,600	13.38	61,800	8.15	39,800	48,100	6.34
2021-2022	7,722,000	86,900	1.14	102,000	13.28	63,200	8.23	38,800	48,100	6.26
2022-2023	7,808,000	86,000	1.11	102,400	13.19	64,600	8.32	37,800	48,100	6.19
2023-2024	7,893,000	85,000	1.09	103,000	13.12	66,100	8.42	36,900	48,100	6.13
2024-2025	7,977,000	84,000	1.06	103,500	13.04	67,600	8.52	35,900	48,100	6.06
2025-2026	8,059,900	82,900	1.04	104,000	12.97	69,200	8.63	34,800	48,100	6.00
2026-2027	8,139,300	79,400	0.99	104,600	12.91	73,300	9.04	31,300	48,100	5.94
1980-1990		**734,300**		**705,300**		**339,800**		**365,000**	**369,200**	
1990-2000		**1,027,500**		**787,600**		**404,900**		**382,700**	**644,800**	
2000-2010		**755,800**		**845,100**		**477,500**		**367,600**	**388,200**	
2010-2020		**897,500**		**975,100**		**558,700**		**416,400**	**481,000**	
2020-2027		**592,000**		**721,100**		**465,800**		**255,300**	**336,700**	
2000-2027		***2,245,300***		***2,541,300***		***1,502,000***		***1,039,300***	***1,205,900***	

***Rates are calculated per 1,000-midpoint population.**

SOURCES: Forecasts of the State Population: November 2002 Forecast, Washington State Office of Financial Management.

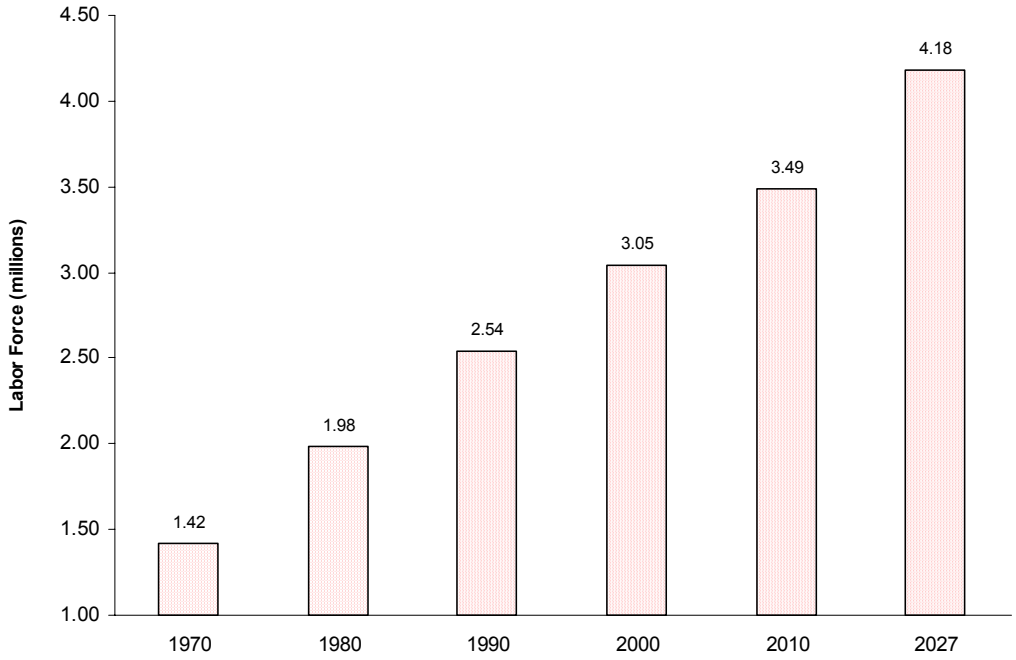
CHAPTER 2

Long-Term Forecast of the Washington Labor Force

BETWEEN 1970 AND 2002, total labor force* in Washington more than doubled from 1.42 million to 3.1 million. The state is expected to gain an additional one million workers in the next 25 years and, by the year 2027, has a workforce of 4.2 million. The forecast represents a 1.3 percent average annual growth rate for the state labor force from 2002 to 2027, about half the pace of the 2.4 percent annual growth in the past three decades.

In the first half of the 1990s, labor force in the state grew 2.0 percent per year. The growth then accelerated to a 2.7 percent annual rate in the 1995-98 period, slowed to 1.2 percent in 1999, and then dipped into negative in the next two years. The forecast for the next five years, from 2002 to 2006, calls for a moderate recovery of annual growth to 1.8 percent.

Figure 2-1
Washington Labor Force Growth



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch **APRIL 2003**

*As used in this report, the term "labor force" refers to the *civilian non-institutional labor force*, which is composed of individuals age 16 or over who are currently employed (either part-time or full-time) or who are actively seeking employment. Individuals who are in nursing homes, prison, or the military (referred to as the institutional population) are not considered to be either in the civilian labor force or part of the base population from which the labor force is drawn. Other individuals who are not in the civilian labor force are those who are not employed *and* not seeking employment. Common reasons for not being in the labor force include retirement, ill health or injury, attending school, or doing housework at home.

In the next 25 years, Washington's labor force growth will decelerate. The state's workforce is expected to increase at a 1.7 percent annual rate during the period from 2002 to 2010, after which the growth rate will decline considerably to an annual average of 1.1 percent between 2010 and 2027.

The slowdown in labor force growth is a national phenomenon related to the aging of the population. Since labor is a major factor of production, the slowdown in labor force growth will dampen the growth of economy. This is a particularly important concern because, after 2010, the baby boom generation will start entering retirement en masse and drawing Social Security and Medicare benefits. The fast-growing retiree and elderly population will have to be supported by a labor force that increases relatively slowly. Besides the ongoing Social Security reform efforts, delayed retiring and future productivity increases are expected to offset the drag exerted by the slowing labor force growth.

There will be some significant changes in the future labor force. As the economy becomes more dynamic, future labor market participants need to be able to promptly adapt to the quick-changing working environment. Also, as firms constantly restructure to improve operating efficiency and market competitiveness, future workers should anticipate job change many times in their working careers.

On the other hand, there will be increasing demand for "local services" that produce job opportunities for low- or moderate-skilled workers. Demand for these services will be stimulated by an increasing number of multi-earner households and aging baby boomers. These services are much less susceptible to the competition of foreign imports.

The future labor force will be more diversified. In 2027, non-white workers will account for 15.5 percent of total labor force in Washington, compared to the 8.5 and 12.2 percent shares in 1990 and 2000, respectively. By 2027, 18.5 percent of the state's workforce will be Hispanic, nearly five folds the 3.8 percent share in 1990. In addition, over the next two-and-a-half decades, female labor force in the state will increase 44 percent, compared to the 32 percent growth for male workers.

The size and composition of the Washington labor force is determined by three major factors:

(1) Natural population changes -- aging, births, and deaths.

(2) Net-migration -- difference in the number of persons entering and leaving the state.

(3) Labor force participation rates -- proportion of people 16 years of age and older who are employed or seeking employment.

The following sections explore the future changes of these factors and their implications in shaping the state's workforce.

Population Change and Labor Force Growth

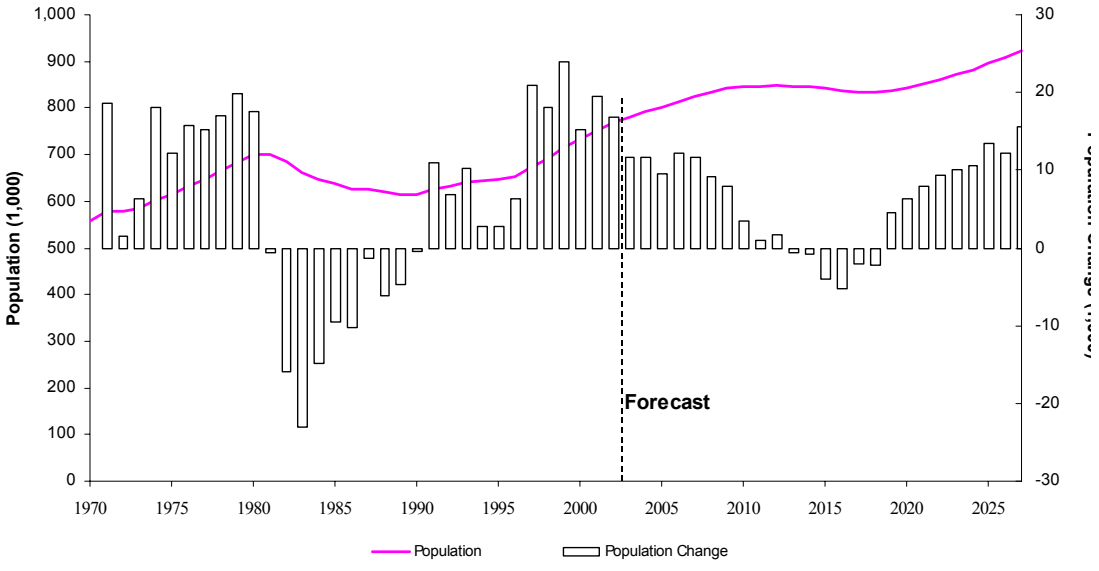
Population growth in the state directly contributes to its labor pool. From 1970 to 2002, the number of persons 16 years old and over grew at an annual rate of 2.1 percent in Washington, significantly higher than the 1.3 percent annual rate for the nation. As a result, the state's labor force grew 2.4 percent per year between 1970 and 2002, far outpacing the 1.8 percent average growth rate for the U.S. during the same period.

Population growth in the state is expected to slow to 1.2 percent per year between 2002 and 2027; similar slowdown is projected for the labor force during the period. The forecasted growth of 1.3 percent per year for the state's labor force is still much higher than the projected 0.8 percent annual increase for the nation as a whole.

People in the 16 to 24 age group account for a majority of new labor market entrants. The state's population in this age cohort actually declined throughout the decade of the 1980s (Figure 2-2), due to lower birth rates beginning in the mid-1960s. Consequently, in 1990 this age group accounted for only 16.6 percent of the state labor force, substantially lower than the 35.0 percent share in 1980.

In the early 1990s, the 16-24 age group began to grow again, although the pace was initially very slow. Population growth in this age group accelerated in the second half of the 1990s and, by the turn of the century, approached the high growth reached in the 1970s. High growth of youth population in the late 1990s will lead to significant additions of new workers to the state's labor pool in the near term. Growth of this age group in the state will once again slow down in the second half of the 2000s.

Figure 2-2
Population Estimates and Forecasts for Ages 16-24



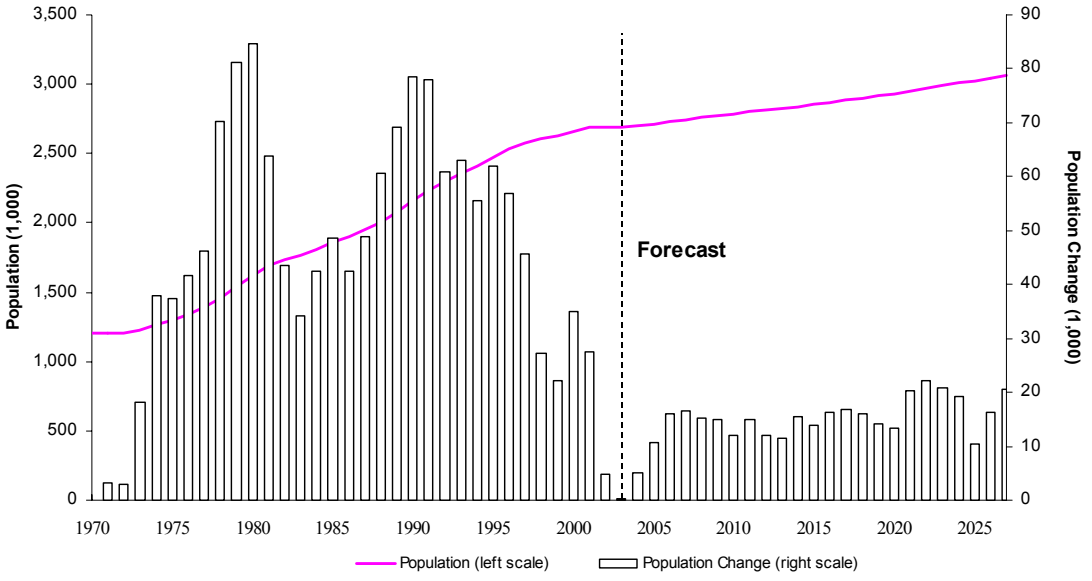
OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch

APRIL 2003

Shifting age structure is a major factor leading to the anticipated slowdown in the growth of the Washington labor force. In the next 25 years, a large portion of the projected population growth will occur in the age groups with low labor force participation rates, thus depressing total labor force participation and workforce growth. The state's 25 to 54 year old population, the most active labor force participants, grew an average of 46,700 persons per year between 1970 and 2002. In contrast, the growth of this age group will drop substantially to an annual average of 14,600 persons over the forecast period.

The forecasted annual growth rate of the 25 to 54 age group in the state is 0.5 percent over the next two-and-a-half decades, far below the growth rates of 2.9 percent and 2.1 percent per year in the 1980s and the 1990s, respectively (Figure 2-3).

Figure 2-3
Population Estimates and Forecasts for Ages 25-54



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch **APRIL 2003**

Migration

Migration affects the labor force in two ways: first, it is an important contributor to population change, and thus labor force growth; second, most of the migrants are young workers with a long-term attachment to the labor force. In the past 25 years, net migration in the state averaged 48,100 per year, directly accounting for about 60 percent of state yearly population growth. Over the forecast horizon, net migration is expected to remain at a level compatible with historical average, due mainly to continued strengths in the state's manufacturing and other traded sector jobs:

- Manufacturing employment in Washington is projected to grow slightly, compared to the forecasted decline in the U.S. Manufacturing jobs offer above-average wages and support a

variety of other jobs in the economy. Strength in the state's manufacturing sector will help stimulate the demand for labor and thus labor-related in-migration.

- Business services will continue to grow at a healthy pace, although not at the same rapid rate as in the late 1980s and the 1990s. Most of the fast-growing business services industries recruit from national or international labor pools; thus, their growth is expected to attract labor from outside the state.
- There has been an increasing number of migrants over age 65 to Washington. Migration decisions of senior citizens are mainly determined by quality of life, amenities, and services available at the destination places. Senior migrants affect the state labor market differently than job-related migrants. On one hand, they are not competing for job opportunities; on the other hand, their assets and incomes contribute to the local economy and the demand for labor. Senior citizens are intensive users of public and private services, thus stimulating employment growth in these sectors. Nationwide, people over 65 years old will increase significantly throughout the forecast period, suggesting that a growing portion of in-migrants will be retired or over age 65.

As a result of the aforementioned economic and non-economic forces, net-migration between 2002 and 2027 will total 1.11 million persons, averaging about 45,180 per year, below the 46,900 annual average of the past 30 years.

Changes in Labor Force Participation

Labor force participation rates in Washington State historically have been higher than the national average, due in large part to a higher concentration of young people who are active labor market participants. From 1970 to 2002, the state's aggregate labor force participation rate increased from 61.5 percent to 66.4 percent. During this period, the male labor force participation rate gradually declined, while the female labor force participation rate rose considerably. The labor force participation rate in the state is projected to increase gradually to 67.7 percent in 2010 and then decline to 66.5 percent level by 2027.

The projected decline in labor force participation is due mainly to changes in age composition of the future population. Basically, for both males and females, labor force participation is highest between the ages of 20 and 54, lower for ages 16 to 19 and ages 55 to 64, and very low for persons in retirement age of 65 and over. Population growth that occurs in age groups with lower labor force participation (e.g., age 65 and over) will not increase the labor force as much as the growth in the high-participation age groups (e.g., age 35 to 44). The changing age structure over time is a major factor that lowers the aggregate labor force participation rate after 2010.

After 2010, the proportion of the state population in the older age groups will increase substantially. The elderly people (age 65+) as a share of the total state population will increase from 12.1 percent in 2010 to 18.8 percent in 2027. This has a dampening effect on the labor force growth since the elderly have much lower labor force participation rates. If the population in 2027 was assumed to have the same age structure as in 2010, the aggregate labor force

participation rate for that year would be 72.1 percent, rather than the projected 66.5 percent. In other words, aging of the population alone depresses the state labor force participation rate by 5.6 percentage points.

Table 2-1 shows a comparison of the 1990 Washington labor force and labor force participation rates by age and sex, with the corresponding forecast for 2027.

Table 2-1
Washington Labor Force by Age and Sex, 1990 and 2027

	Labor Force				Labor Force Participation Rate		
			1990-2027				1990-2027
Age	1990	2027	Net Additions	Percent Change	1990	2027	Percentage Pt. Difference
All							
16-24	422,227	631,901	209,674	49.7%	71.7%	70.5%	-1.2%
25-54	1,844,650	2,705,107	860,457	46.6%	86.7%	89.7%	3.1%
55-64	213,800	624,690	410,891	192.2%	56.4%	68.3%	11.9%
65+	57,418	216,717	159,299	277.4%	10.5%	14.8%	4.3%
Total	2,538,095	4,178,416	1,640,321	64.6%	69.7%	66.5%	-3.2%
Male							
16-24	214,893	303,338	88,445	41.2%	73.5%	67.9%	-5.6%
25-54	1,005,393	1,379,654	374,261	37.2%	95.4%	91.0%	-4.4%
55-64	124,354	624,690	500,336	402.3%	67.5%	77.4%	9.8%
65+	33,806	216,717	182,910	541.1%	14.5%	19.2%	4.7%
Total Male	1,378,447	2,524,400	1,145,953	83.1%	78.2%	70.0%	-8.1%
Female							
16-24	207,334	328,563	121,229	58.5%	70.0%	73.1%	3.1%
25-54	839,257	1,325,453	486,196	57.9%	78.1%	88.5%	10.4%
55-64	89,445	271,014	181,568	203.0%	45.8%	59.2%	13.4%
65+	23,612	87,761	64,149	271.7%	7.6%	11.1%	3.5%
Total Female	1,159,648	2,012,791	853,143	73.6%	61.8%	63.0%	1.2%

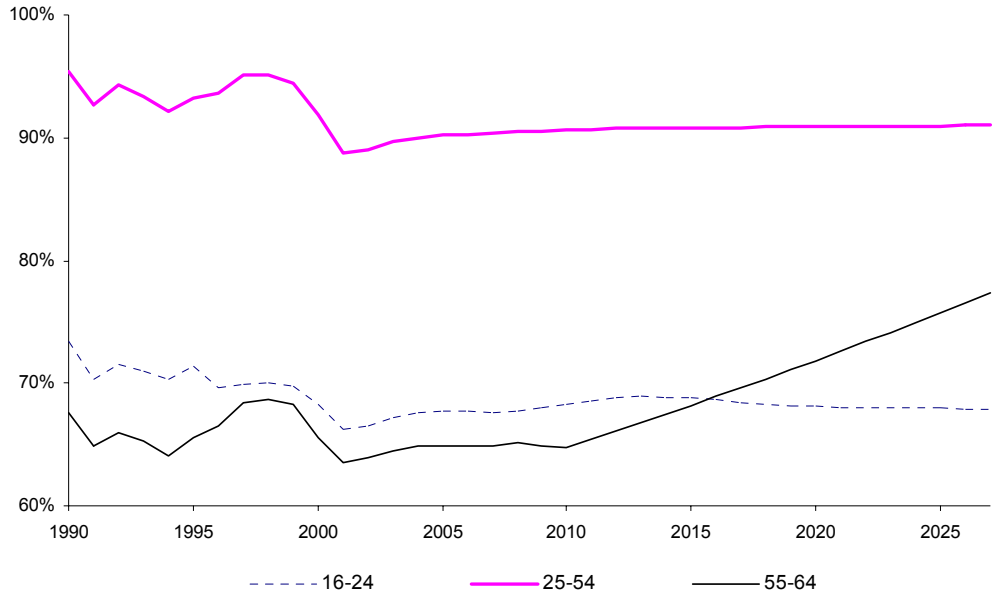
Male Labor Force Participation

The total male labor force participation rate has declined slightly in the past two decades, due primarily to early retirements. Improved retirement options have led to a decline in the labor force participation rates of older men. Generous public and private pension systems and social insurance programs (Social Security, Medicare, and employer-provided health insurance), as well as increases in the wealth and asset incomes of senior citizens have been the contributing factors for choosing early retirement. Nationally, the labor force participation rate of males age 55 to 64 years old dropped from 83.0 percent in 1970 to 67.4 percent in 2001.

In the future, many people over age 65, especially those in the 65-70 age group, will choose to stay in the workforce longer because they lack the economic resources necessary to maintain a desired retirement lifestyle. This is especially the case considering possible retrenchments in

Social Security and Medicare benefit programs. A longer life expectancy also contributes to the need to extend working years. These postulations have been incorporated into the present labor force forecasts for the state. The labor force participation rate of males in the age 55-64 is projected to rise from 67.5 percent in 1990 to 77 percent by 2027 (Figure 2-4a).

Figure 2-4a
Washington Male Labor Force Participation Rates (Age 16-64)



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch **APRIL 2003**

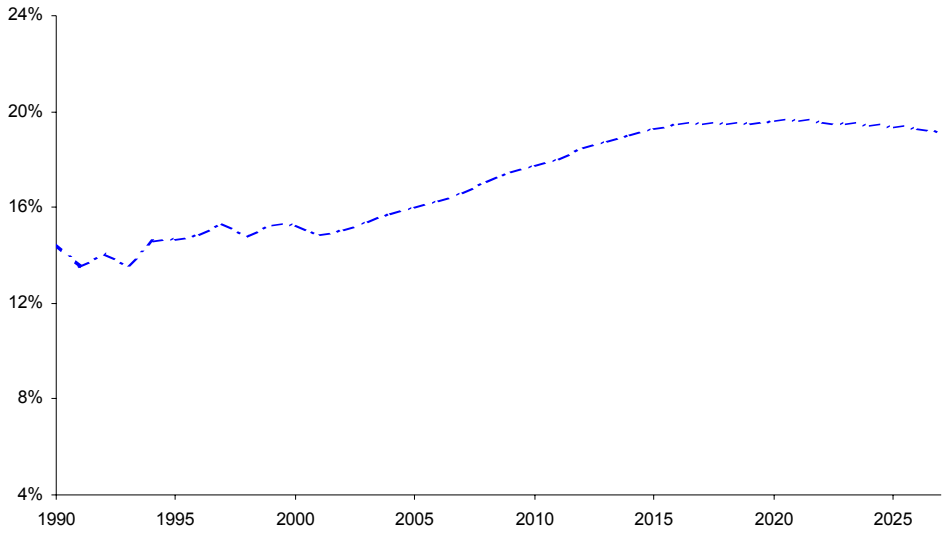
Educational attainment is the major factor why an increase in the labor force participation rate of those over age 65 is anticipated (Figure 2-4b). Table 2-2 shows that education achievement is a very significant factor in determining the working status of the elderly.

Since people in the 40 to 44 age group in 2000 are two-and-a-half decades removed from the 65-69 age cohort in 2025, their educational profile provides a close approximation to the educational profile of the 65-69 age group in 2025. Table 2-2 also shows that, since in 2000 the educational attainment of the 40-44 age group was much higher than that of the 65-69 age group, the elderly people in 2025 will have a much higher labor force participation rate than the participation rate of comparable cohort today.

Higher educational levels make it easier for older persons to stay in the labor force. Well-educated persons are more likely to obtain and remain with (white-collar) jobs that demand less physical strength, provide better compensations and more flexible working schedules than those less-educated.

Business cycles also exert significant influence on labor force participation behavior. The male labor force participation rate was affected more than the female rate by the 1990-91 national recession. The downsizing and cost-cutting operations in many large corporations in the early 1990s caused some people to drop out of the labor market entirely and discouraged others from entering the labor market.

Figure 2-4b
Washington Male Labor Force Participation Rate (Age 65+)



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch **APRIL 2003**

Table 2-2
Elderly Labor Force Participation and Education: Washington, 2000

Schooling Completed	Age 65-69 Labor Force Participation Rate	Share of Age 65-69 Population	Share of Age 40-44 Population
1-9 grades	15.1%	8.6%	4.0%
10-12 grades	13.1%	9.5%	6.2%
High school graduate	17.6%	30.5%	23.8%
Some college/Associate	22.1%	26.1%	38.8%
BA and higher	27.6%	25.2%	27.2%
Total	20.6%	100.0%	100.0%

Source: 2000 Census PUMS data file.

Female Labor Force Participation

One of the most significant labor market phenomena in the twentieth century is the increase of women in the workforce. Nationwide, the female labor force participation rate increased from 33.8 percent in 1950 to 57.5 percent in 1990, then reached 59.6 percent in 2002. As a result, the gap between male and female labor force participation rates has narrowed substantially over the past five decades. In 1950, the male labor force participation rate was 53 percentage points above the female rate; by 2002, the gap shrank to 15 percentage points.

Key factors contributing to the trend of rising female labor force participation include increasing level of educational attainment, decisions to delay marriage and childbearing, changing gender roles, availability of market substitutes for housework, and changing technologies that reduce the demand for physical labor. Declining real wages in the past three decades also have contributed: in many households, a second income was needed to help offset the loss in real earnings of male householders.

Shifting of the female gender roles from an emphasis on housekeeping to paid market jobs will continue to bring more women into the labor force. Economic pressures will also continue to drive women into the market workforce, especially for single mothers.

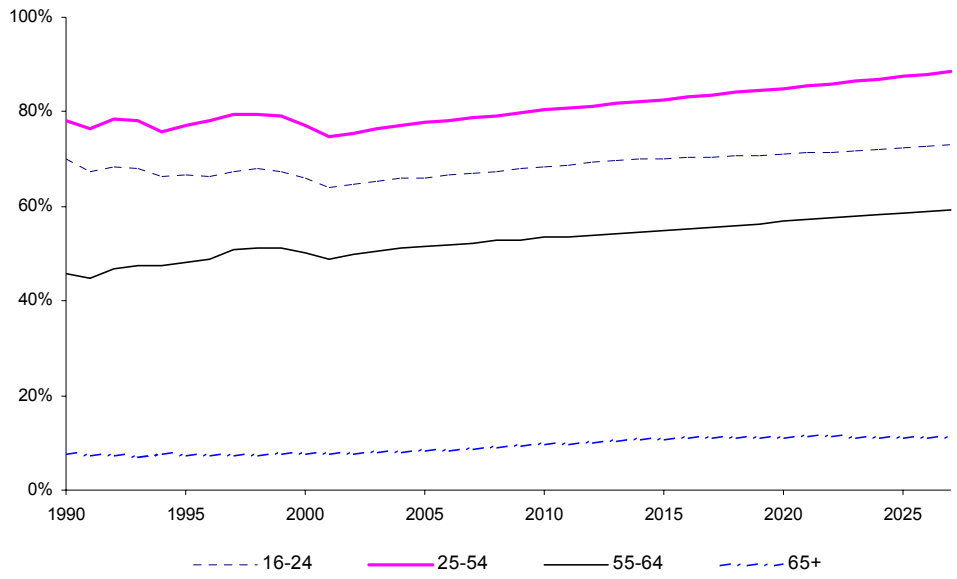
Indeed, the general orientation toward work and overall attachment to the labor force are already roughly comparable for young men and women. Furthermore, as the demographic forces result in slower labor force growth in the next few decades, employers will increasingly look to women as an important source of labor.

On the other hand, although the long-term trend of rising female participation in the labor force is expected to continue, the increase will slow down. Actually, the pace of increase in female labor force participation began to slow significantly in the mid-1980s as the female rates approached those of males. Some gender differences still persist between men and women in terms of perceived parenting and other family responsibilities. Today women still bear a disproportionate share of childrearing and housework responsibilities in most families. As a result, most woman workers will continue to experience more frequent and longer spells of time away from work than men. This means that female labor force participation is not likely to reach the male rates in the near future. All these considerations are embedded in the forecast for female labor force participation rates (Figure 2-5).

In summary, the trend of rising female labor force participation will continue, although at a slower pace than in the previous three decades. In Washington State, the overall workforce participation rate of women is expected to increase from 61.5 percent in 2000 to 62.7 percent in 2010. Then, as a large proportion of the population moves into the age groups with low labor attachment, the rate will remain little changed and reach 63.0 percent by 2027.

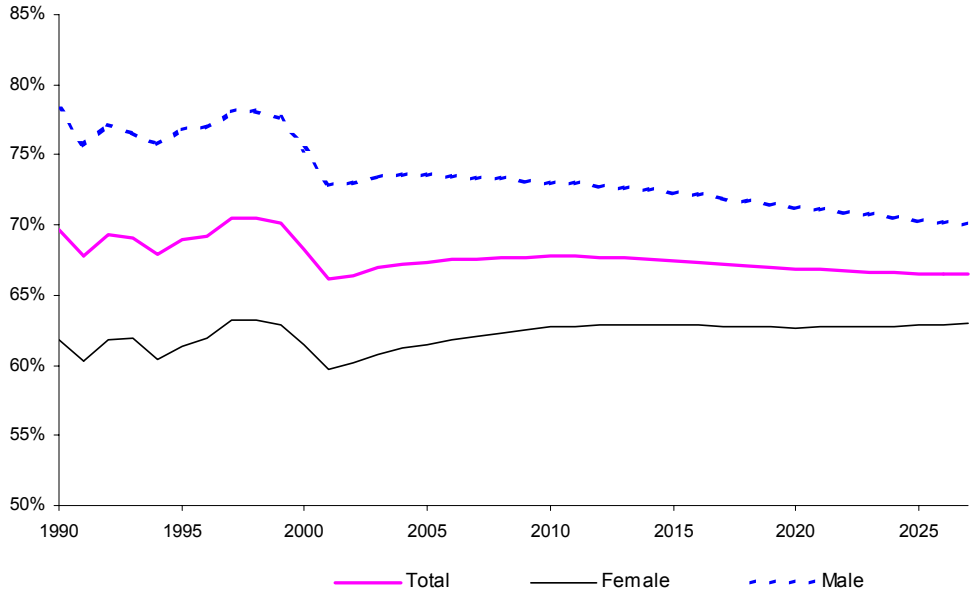
As discussed above, changes in the male and female labor force participation rates varied by age and sex. Together, the state total labor force participation rate is anticipated to gradually increase from 66.4 percent in 2002 to 67.7 percent in 2010, and then decline to 66.5 percent by 2027.

Figure 2-5
Washington Female Labor Force Participation Rates



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch APRIL 2003

Figure 2-6
Forecast of Washington Labor Force Participation Rates by Sex



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch APRIL 2003

Forecast of Total Labor Force

The projected changes in labor force participation rates, net migration, natural population increase, and aging of the population result in a downward trend for the state's labor force growth. Between 1990 and 2000, the Washington labor force grew by 20 percent, representing an average annual growth rate of 1.8 percent. This rate is significantly lower than the 3.0 percent growth per year experienced in the previous two decades. In the decade from 2000 to 2010, the state's labor force growth is expected to decelerate to 1.4 percent per year, or 14.6 percent total growth for the decade. Looking further into the future, the state's labor force growth is projected to continue slowing down between 2010 and 2027 as the Baby Boom generation reaches retirement age, averaging 1.1 percent annually during the period (Table 2-3).

While the Washington labor force will increase at a relatively slow pace over the next 25 years, the growth of the U.S. labor force is expected to be even more sluggish. The major reason for the difference between Washington and U.S. labor force growth is population growth. Between 2002 and 2027, the Washington's population 16 years old and over is forecasted to grow at an annual average rate of 1.3 percent, while the comparable population group in the nation is projected to increase only 0.9 percent per year. The difference is mainly attributed to the state's continuing ability to attract migrants.

Table 2-3
Washington Labor Force Change

	Changes in Labor Force		
Decade	Number (1,000s)	Percent Change (%)	Average Annual Growth (%)
1950-1960	149.8	15.9	5.5
1960-1970	320.1	29.4	2.6
1970-1980	567.5	40.0	3.4
1980-1990	552.9	27.9	2.5
1990-2000	507.2	20.0	1.8
Forecast			
2000-2010	443.6	14.6	1.4
2010-2020	406.3	11.6	1.1
2020-2027	283.2	7.3	1.0

Washington labor force participation rates historically have been slightly above national rates, a tendency which is expected to continue. Table 2-4 provides labor force estimates for Washington between 1980 and 2002, and forecasts through 2027.

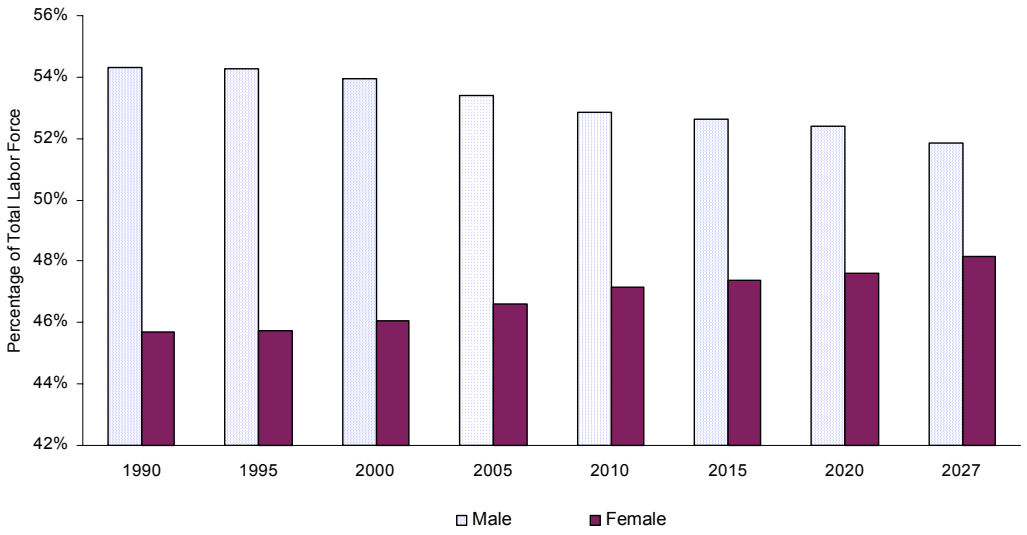
The Changing Profile: Aging, Female, and Non-White Workforce

Changes in labor force participation, combined with demographic changes (births, deaths, aging, and migration), will alter the composition of the Washington labor force. The forecast shows that the state workforce will become more and more diversified in terms of age, sex, and racial mixes. These trends parallel those projected for the nation's workforce.

Higher Proportion of Women in the Labor Force

Over the forecast period, the slow but steady increases in labor force participation by women, combined with a gradual decline in male labor force participation, will increase the female share of the total labor force. In 2000, women represented 46.0 percent of the labor force; by 2027 their share will rise to 48.2 percent (Figure 2-7). Women will contribute to more than half of "net additions" to the labor force between 2000 and 2027. "Net addition" is the difference between the number of labor force entrants and the amount of those leaving the labor force.

Figure 2-7
Forecast of Washington Labor Force Distribution by Sex



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch **APRIL 2003**

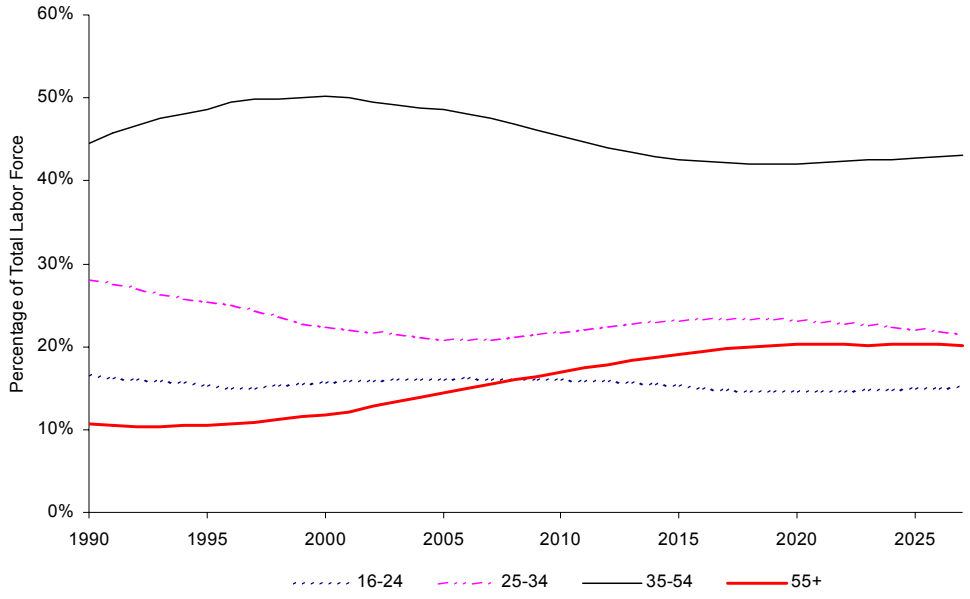
The increasing importance of women as a source of labor will motivate employers to provide benefit programs that accommodate the needs of female workers. Some desirable employee benefits include on-site childcare, flexible work schedules, order and delivery of household goods such as groceries, dry cleaning of clothes, etc. For employers, these work-life benefit programs will be critical to their ability to attract qualified employees, and to raising the productivity of their female workers.

Aging of Labor Force

Between 2002 and 2027, the number of Washington workers over 55 years old will increase by about 116 percent, while those aged 16 to 54 will increase by only 25 percent. Consequently, the age silhouette of the state labor force in 2027 will be very different from that in 1990. Older persons (55 years old and over) are projected to represent about 20 percent of all Washington labor force in 2027, substantially higher than the 13 percent share in 2002 (Figure 2-8).

As part of the aging process, the workforce will go through an interim "middle-aging" phase. By 2000, middle-aged workers — those 35 to 54 years old — constituted about 50 percent of the labor force, significantly above the 45 percent share just a decade ago. A by-product of the middle aging of the labor force is generational crowding or "mid-career crunch." The sharp rise of these middle-age workers will lead to an abundant supply of persons qualified for mid-career promotional opportunities, while prolonged staying of top-level, older workers may diminish the prospects of middle-age employees looking for career advancements. One likely result may be increasing job or career changes in the future years.

Figure 2-8
Age Profile of Washington Labor Force



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch **APRIL 2003**

Table 2-4

Washington Labor Force: Historical and Forecast

		Civilian Non-Institutional Population			Labor Force			Labor Force Participation Rate		
Year	Total Population	Total 16 & Over	Male 16 & Over	Female 16 & Over	Total	Male	Female	Total	Male	Female
1980	4,132,200	3,061,000	1,479,700	1,581,200	1,984,600	1,157,200	827,400	64.8	78.2	52.3
1981	4,229,300	3,128,100	1,511,000	1,617,100	1,996,800	1,158,300	838,500	63.8	76.7	51.9
1982	4,276,500	3,166,500	1,530,300	1,636,100	2,024,500	1,160,700	863,700	63.9	75.8	52.8
1983	4,307,200	3,193,200	1,541,600	1,651,600	2,068,400	1,174,300	894,100	64.8	76.2	54.1
1984	4,354,100	3,234,100	1,561,100	1,672,900	2,050,400	1,169,300	881,100	63.4	74.9	52.7
1985	4,415,800	3,282,600	1,584,800	1,697,900	2,090,400	1,181,800	908,600	63.7	74.6	53.5
1986	4,462,200	3,330,300	1,608,900	1,721,400	2,198,500	1,220,700	977,800	66.0	75.9	56.8
1987	4,527,100	3,388,600	1,637,100	1,751,500	2,257,500	1,234,400	1,023,200	66.6	75.4	58.4
1988	4,616,900	3,454,300	1,667,800	1,786,500	2,315,800	1,247,100	1,068,700	67.0	74.8	59.8
1989	4,728,100	3,537,000	1,708,400	1,828,600	2,450,900	1,356,000	1,094,900	69.3	79.4	59.9
1990	4,866,700	3,640,900	1,763,600	1,877,300	2,538,100	1,378,400	1,159,600	69.7	78.2	61.8
1991	5,021,300	3,739,700	1,813,400	1,926,300	2,535,100	1,372,700	1,162,400	67.8	75.7	60.3
1992	5,141,200	3,824,600	1,856,900	1,967,700	2,649,800	1,432,600	1,217,200	69.3	77.2	61.9
1993	5,265,700	3,912,800	1,903,000	2,009,800	2,701,000	1,456,100	1,244,900	69.0	76.5	61.9
1994	5,364,300	3,988,200	1,940,800	2,047,400	2,706,500	1,469,300	1,237,300	67.9	75.7	60.4
1995	5,470,100	4,069,700	1,981,700	2,088,000	2,804,400	1,522,300	1,282,200	68.9	76.8	61.4
1996	5,567,800	4,151,200	2,022,300	2,128,900	2,873,900	1,556,400	1,317,500	69.2	77.0	61.9
1997	5,663,800	4,232,000	2,062,600	2,169,400	2,983,300	1,611,500	1,371,800	70.5	78.1	63.2
1998	5,750,000	4,310,400	2,103,700	2,206,700	3,037,900	1,642,600	1,395,200	70.5	78.1	63.2
1999	5,830,800	4,387,400	2,143,500	2,243,900	3,074,600	1,662,700	1,411,900	70.1	77.6	62.9
2000	5,894,100	4,459,300	2,178,800	2,280,500	3,045,300	1,643,300	1,402,100	68.3	75.4	61.5
2001	5,974,900	4,528,600	2,212,600	2,315,900	2,995,700	1,611,800	1,384,000	66.2	72.8	59.8
2002	6,041,700	4,592,100	2,244,400	2,347,700	3,050,700	1,637,500	1,413,200	66.4	73.0	60.2
Forecast										
2005	6,230,000	4,778,000	2,338,300	2,439,800	3,219,500	1,719,200	1,500,300	67.4	73.5	61.5
2010	6,649,800	5,150,600	2,527,100	2,623,500	3,488,900	1,843,900	1,645,100	67.7	73.0	62.7
2015	7,098,500	5,490,700	2,698,300	2,792,400	3,704,200	1,949,200	1,754,900	67.5	72.2	62.8
2020	7,547,300	5,822,400	2,863,600	2,958,900	3,895,200	2,040,100	1,855,200	66.9	71.2	62.7
2027	8,139,300	6,286,600	3,092,800	3,193,800	4,178,400	2,165,600	2,012,800	66.5	70.0	63.0

Notes:

Total population is based on the November 2002 official Office of Financial Management population estimates and forecasts.

Total population estimates and forecasts are for April 1 of each year.

Estimates/forecasts of civilian non-institutional population, labor force, and labor force participation rate are "annual average" measurements.

Projection of the civilian non-institutional population is based on 1990 proportion of the male and female Washington population participating in the military or residing in prisons, nursing homes, and other institutions.

Labor force participation rates represent the proportion of the civilian non-institutional population that is employed or unemployed based on federal Bureau of Labor Statistics definitions.

The repercussions caused by this "middle-aging" phenomenon may be further exacerbated during a business downturn when firms accelerate "delayering" management structure and cost cuttings in order to remain competitive. This is similar to what happened in the first half of the 1990s, when the flattening or compressing of management structures in firms eliminated large numbers of mid-management positions. Many of these dislocated managers were unable to find employment with compensations comparable to their previous jobs.

The elderly workforce is characterized by a high proportion of part-time and temporary working arrangements. Today, a lot of old workers (i.e. age 65+) willfully hold part-time jobs, only a few of them want to switch to full-time employment. Also, a majority of the elderly workers perceive their current working as temporary, indicating their readiness to change jobs or exit the labor market (for retirement).

The aging of the workforce will present unique challenges to employers. Businesses will need management and personnel practices that can effectively accommodate older employees. Among the challenges will be:

(a) establishing new reward and incentive structures as traditional hierarchical promotional opportunities decline;
(b) facilitating career or job changes for "squeezed" middle-age or "topped-out" older employees;
(c) planning and implementing human resource management to accommodate less predictable retirement age and exits/re-entries of elderly workers;
(d) meeting varied demand for employee benefits, e.g. the elderly workers' preference for long-term care;
(e) dealing with increased pressures on retirement systems; and
(f) making work more versatile and challenging.

Non-White and Hispanic Workforce

Along with the expected increase of older workers and women in the labor force, non-whites will constitute an increasing share of the Washington labor force in the coming decades. Labor force growth rates of African, Asian, and other non-white Americans are expected to be considerably higher than the white.

In 1980, 6.2 percent of the Washington labor force was non-white; in 2000, the share increased to 12.2 percent. From 2002 to 2027, the non-white labor force in Washington is expected to grow at a 2.1 percent annual rate, compared to the 1.1 percent and 1.3 percent annual rates for the white and the total labor force, respectively. While in 2002 non-white workers represented only 12.7 percent of total labor force in the state, they will account for 23 percent of the state's net labor force growth between 2002 and 2027. The non-white share is expected to reach 14.1 percent in 2010, and 15.5 percent by 2027. Table 2-5 shows the changing racial composition of the state labor force.

The main reason for an increasing share of non-whites in the labor force is that the non-white population is expected to grow at a much higher rate than the white population. A second factor is the younger age composition of the non-white population compared to whites. Non-whites are also expected to continue increasing their labor force participation rates.

Another important labor trend, in the state and nationwide, is ethnic diversification. Between 2000 and 2027, workers of Hispanic origin in the state will double from 368,900 to 774,000. As a result, Hispanics will account for 18.5 percent of the Washington labor force by 2027, one-and-a-half times the share of 12.1 percent in 2000.

Table 2-5
Labor Force Composition by Race: Washington

Year	Total Labor Force (1000s)	Share of Total Labor Force				
		White	African American	Asian & Other	Total Non-White	Hispanic
1990	2538.1	91.5%	2.7%	5.7%	8.5%	3.8%
1995	2804.4	89.3%	3.1%	7.6%	10.7%	7.1%
2000	3045.3	87.8%	3.4%	8.8%	12.2%	12.1%
2005	3219.5	86.6%	3.6%	9.8%	13.4%	14.0%
2010	3488.9	85.9%	3.8%	10.4%	14.1%	15.5%
2015	3704.2	85.3%	3.8%	10.9%	14.7%	16.9%
2020	3895.2	84.6%	3.9%	11.5%	15.4%	18.4%
2027	4178.4	84.5%	3.9%	11.6%	15.5%	18.5%

The trend toward racial and ethnic diversification poses a critical issue in the effort to elevate worker skills in the future. Today, the average education level of African American workers of every age cohort is far below their white counterparts. The gap has been narrowing, but at a slow pace. The gap for Hispanic workers is even greater. In 1990, only 56.7 percent of the Washington Hispanic population 25 years of age or older completed high school or equivalency, compared to the 85.0 percent rate for the non-Hispanic persons in the same age group. As future economic growth relies more and more on productivity improvement, raising the education levels of these fast-growing racial and ethnic minorities becomes a major policy concern.

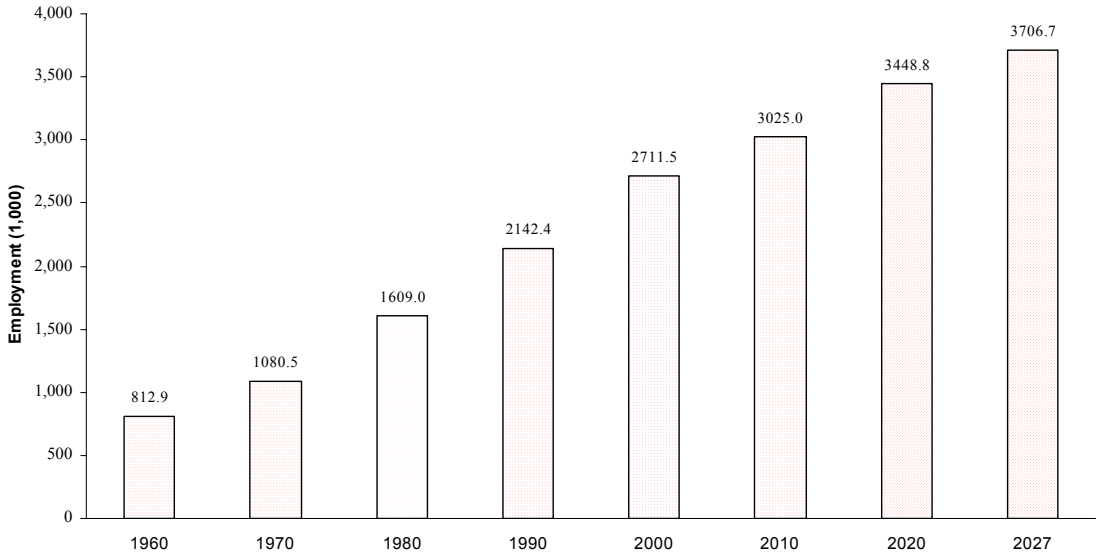
CHAPTER 3

Long-Term Forecast of Washington Wage and Salary Employment

IN 2002, THERE WERE 2.65 MILLION non-agricultural wage and salary jobs[1] in Washington State, about two-and-a-half times the state's employment level in 1970. Employment growth in the state averaged 2.8 percent per year between 1970 and 2002, far above the U.S. average annual rate of 1.9 percent during the same period.

Total Washington non-agricultural wage and salary employment is projected to reach 3.03 million in the year 2010 and 3.71 million by 2027 (Figure 3-1). This represents an average annual growth rate of 1.6 percent during the 2002-10 period, and 1.2 percent between 2010 and 2027. The forecast is reported in Table 3-1. Table 3-2 presents a more detailed, sector-by-sector forecast of wage and salary employment.

Figure 3-1
Washington Total Non-Agricultural Wage and Salary Employment



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch **APRIL 2003**

[1] The labor market terms used in this chapter have distinctive definitions: The **Labor Force** consists of the employed and the unemployed. It includes only non-institutionalized civilians 16 years of age and older. **Total Employment** is the number of employed persons by place of residence, including the self-employed and persons working in agricultural jobs. Total employment excludes non-civilian military personnel. The **Unemployed** represents the number of persons in a given month who are not working but are actively seeking work, as indicated by unemployment insurance claims and responses to the Current Population Survey. **Non-Agricultural Wage and Salary Employment** describes the number of jobs by place of work in non-agricultural industries in a given month reported by firms in the monthly Current Employment Statistics industry survey. The survey data are then extrapolated to produce an estimate of total industry employment. Non-agricultural wage and salary employment was about 89 percent of total employment in 1995.

Table 3-1
Washington Labor Force and Employment

Year	Labor Force	Total Employed	Unemployed	Unemployment Rate(%)	Total Non-Agricultural Wage & Salary Employment
1970	1,417,100	1,285,900	131,200	9.3	1,080,500
1975	1,562,200	1,412,300	149,800	9.6	1,225,500
1980	1,984,600	1,828,200	156,400	7.9	1,609,000
1981	1,996,800	1,806,000	190,800	9.6	1,612,000
1982	2,024,500	1,778,900	245,600	12.1	1,568,800
1983	2,068,400	1,837,700	230,700	11.2	1,586,000
1984	2,050,400	1,856,900	193,500	9.4	1,659,700
1985	2,090,400	1,920,700	169,700	8.1	1,710,300
1986	2,198,500	2,017,800	180,700	8.2	1,769,900
1987	2,257,500	2,086,800	170,700	7.6	1,851,500
1988	2,315,800	2,172,800	143,000	6.2	1,941,100
1989	2,450,900	2,299,600	151,300	6.2	2,046,300
1990	2,538,100	2,412,900	125,200	4.9	2,142,400
1991	2,535,100	2,373,200	161,900	6.4	2,177,400
1992	2,649,800	2,448,800	201,000	7.6	2,221,900
1993	2,701,000	2,495,000	206,000	7.6	2,251,700
1994	2,706,500	2,532,800	173,700	6.4	2,304,100
1995	2,804,400	2,625,900	178,500	6.4	2,346,800
1996	2,873,900	2,687,100	186,800	6.5	2,415,600
1997	2,983,300	2,841,100	142,200	4.8	2,514,200
1998	3,037,900	2,893,300	144,600	4.8	2,594,700
1999	3,074,600	2,929,200	145,400	4.7	2,648,700
2000	3,045,300	2,887,500	157,800	5.2	2,711,500
2001	2,995,700	2,804,000	191,700	6.4	2,696,400
2002	3,050,700	2,836,100	214,600	7.0	2,654,200
Forecast					
2005	3,219,500	3,023,000	196,500	6.1	2,793,800
2010	3,457,600	3,261,100	196,500	5.7	3,025,000
2015	3,637,300	3,448,800	188,500	5.2	3,254,000
2020	3,790,200	3,616,000	174,200	4.6	3,448,800
2027	3,981,000	3,785,900	195,100	4.9	3,706,700
Change					
1970-1980	567,500	542,300	---	---	528,500
1980-1990	553,500	584,700	---	---	533,400
1990-2000	507,200	474,600	---	---	569,100
2000-2010	412,300	373,600	---	---	313,500
2010-2027	523,400	524,800	---	---	681,700
Growth Rates					
1970-1980	3.4%	3.6%	---	---	4.1%
1980-1990	2.5%	2.8%	---	---	2.9%
1990-2000	1.8%	1.8%	---	---	2.4%
2000-2010	1.3%	1.2%	---	---	1.1%
2010-2027	0.8%	0.9%	---	---	1.2%

Long-Term Employment Trends

Three important elements contribute to the forecast of long-term employment growth. First is growth of the indigenous labor force through births, deaths, and aging. Second is the long-term level of unemployment. And third is the change in the size of the available labor force due to net migration (the difference between workers leaving and entering the state). Growth of the labor force due to net migration, in turn, depends heavily on the strength of the state economy relative to other parts of the country. The long-term labor force forecast in Chapter 2 of this report takes into account all these three elements. Based on these considerations, the Washington labor force is forecasted to increase by about 1.13 million, or 1.3 percent annually, between 2002 and 2027.

At any given time, a portion of the labor force is unemployed. Since 1970, the Washington unemployment rate has ranged from a low of 4.7 percent in 1999 to a high of 12.1 percent in 1982. For the most part, changes of the Washington's unemployment rate over time has tracked closely with the national business cycles, but at a level about 1 to 2 percentage points above the national average.

The unemployment rate in Washington has been about 2 to 4 percentage points above the U.S. rate during most economic downturns, but much closer to the U.S. rate during recoveries and expansions. Over the last ten years, however, the gap between Washington's and the U.S. unemployment rates has narrowed. In the 1990s, the Washington-U.S. difference averaged about 0.5 percentage point. The persistent gap between the U.S. and Washington unemployment rates reflects in part the relatively high concentration of seasonal jobs in the state. Also, large numbers of in-migrants were attracted to Washington during good economic times, they added to the state's labor pool and thus limited reductions in the state's unemployment rate.

The Washington economy experienced strong growth in the second half of the 1990s, leading to a state unemployment rate below 5 percent. Between 2002 and 2027, the state unemployment rate is forecasted to gradually decline from 7.0 percent toward the 6 percent level. This implies that the trends and factors contributing to the narrowing gap between the U.S. and Washington unemployment rates will continue. By 2027, there will be 3.79 million employed Washington residents, an increase of about 950,000 employed persons, or 33 percent, from the 2002 level.

Goods-Producing Employment

Manufacturing will maintain its vital presence in the Washington economy over the next 25 years. The trend toward raising capital investment to enhance productivity growth, both in developed and developing countries, will assure a strong market for Washington's "high-tech" manufacturing products. However, some manufacturing sectors in the state, such as lumber and aluminum, are expected to decline as they face escalating production costs and intensifying national and international competitions.

Table 3-2
Washington Non-Agricultural Wage and Salary Employment by Industry

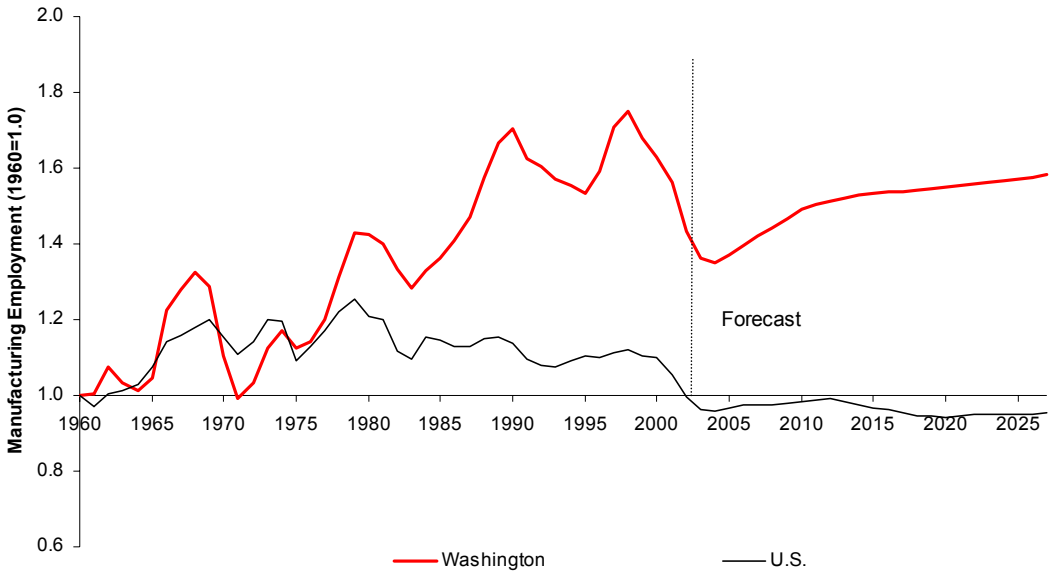
	Actual				Forecast						Average Annual Growth Rates (%)				
	1960	1970	1980	1990	2000	2005	2010	2015	2020	2027	1960-80	1980-90	1990-00	2000-10	2010-27
Manufacturing 1/	216,700	239,500	308,800	369,400	353,100	296,600	323,600	332,500	335,700	342,700	1.8	1.8	-0.5	-0.9	0.3
Non-durable Manufacturing	70,800	74,500	87,600	108,400	108,700	98,100	101,800	103,100	103,400	105,800	1.1	2.2	0.0	-0.7	0.2
Foods & Kindred Products	27,100	29,000	32,000	37,600	41,500	37,200	37,400	36,800	35,700	35,900	0.8	1.6	1.0	-1.0	-0.2
Apparel Products	3,700	5,500	6,500	7,900	8,300	6,500	6,700	6,700	6,600	6,500	2.9	2.0	0.5	-2.1	-0.2
Paper & Allied Products	17,900	19,800	17,600	18,100	15,900	14,800	14,700	14,500	14,100	13,800	-0.1	0.3	-1.3	-0.8	-0.4
Printing & Publishing	8,700	10,600	15,800	22,500	24,500	22,000	24,300	25,300	26,300	27,800	3.0	3.6	0.9	-0.1	0.8
Chemical & Products 1/	10,600	5,900	8,700	13,200	6,100	5,600	5,900	6,100	6,300	6,500	---	---	---	-0.3	0.6
Misc. Non-durables	2,800	3,700	7,000	9,000	12,400	12,000	12,800	13,700	14,400	15,300	4.7	2.5	3.3	0.3	1.1
Durable Manufacturing	145,900	165,000	221,200	260,900	244,400	198,300	221,600	229,600	232,600	236,700	2.1	1.7	-0.7	-1.0	0.4
Lumber & Wood Products	44,500	42,200	47,000	39,900	33,300	28,500	32,300	32,000	31,700	31,200	0.3	-1.6	-1.8	-0.3	-0.2
Furniture & Fixtures	2,900	3,500	3,300	4,100	5,000	4,000	3,700	3,500	3,200	2,800	0.6	2.2	2.0	-3.0	-1.6
Clay, Glass, Stone Products	5,000	5,800	6,900	7,900	9,200	8,600	8,800	8,800	8,500	8,500	1.6	1.4	1.5	-0.4	-0.2
Primary Metals	10,200	14,100	16,700	13,000	11,100	6,600	6,400	5,500	4,800	4,300	2.5	-2.5	-1.6	-5.4	-2.3
Fabricated Metal Products	6,700	7,400	11,700	12,200	14,900	13,000	13,800	14,600	15,500	16,100	2.8	0.4	2.0	-0.8	0.9
Non-Electrical Machinery	5,700	10,000	15,000	20,500	25,600	20,300	22,000	23,800	26,300	27,200	5.0	3.2	2.2	-1.5	1.3
Electrical Machinery	2,700	4,100	11,200	11,400	20,300	17,700	21,800	25,100	27,500	31,400	7.4	0.2	5.9	0.7	2.2
Aircraft & Parts	57,800	61,500	79,600	116,200	86,100	63,300	73,900	74,900	72,200	68,700	1.6	3.9	-3.0	-1.5	-0.4
Other Trans. Equipment	7,800	13,300	18,700	14,800	15,300	13,400	13,100	13,400	12,600	11,800	4.5	-2.3	0.3	-1.5	-0.6
Instruments	---	---	---	14,700	14,600	14,700	16,200	17,400	18,700	20,800	---	---	-0.1	1.0	1.5
Miscellaneous Mfg.	---	---	4,600	6,100	9,000	8,200	9,600	10,600	11,600	13,900	---	2.9	4.0	0.6	2.2
Mining	1,800	1,700	3,200	3,700	3,600	3,300	3,700	3,900	4,100	4,400	2.9	1.5	-0.3	0.3	1.0
Construction	44,600	53,400	92,900	117,300	160,200	157,000	169,000	180,400	189,600	201,600	3.7	2.4	3.2	0.5	1.0
Trans., Comm., & Utilities 2/	61,300	72,200	91,400	113,000	146,600	153,800	162,900	172,900	183,300	199,700	2.0	2.1	2.6	1.1	1.2
Wholesale Trade	53,600	64,600	100,600	128,500	151,300	147,500	153,200	161,300	168,200	176,300	3.2	2.5	1.6	0.1	0.8
Retail Trade	126,500	176,300	280,800	392,900	493,900	491,100	527,400	566,300	603,300	653,500	4.1	3.4	2.3	0.7	1.3
Finance, Ins, Real Estate	38,300	58,400	91,800	115,500	137,500	155,300	164,000	173,900	180,300	184,800	4.5	2.3	1.8	1.8	0.7
Services	103,500	169,700	308,500	504,300	781,900	860,600	957,800	1,066,200	1,150,900	1,266,000	5.6	5.0	4.5	2.0	1.7
Traded Services 1/	17,200	38,500	83,500	146,300	278,300	292,000	341,900	397,700	440,000	500,600	8.2	5.8	6.6	2.1	2.3
State & Local Government	115,900	186,500	263,000	323,900	413,600	455,900	488,200	523,200	558,300	604,700	4.2	2.1	2.5	1.7	1.3
Federal Government	50,700	58,100	67,900	73,700	69,900	72,800	75,100	73,300	75,000	73,000	1.5	0.8	-0.5	0.7	0.0
Goods-Producing	263,100	294,600	404,900	490,400	516,900	456,900	496,300	516,800	529,400	548,700	2.2	1.9	0.5	-0.4	0.6
Service-Producing	549,800	785,900	1,204,100	1,652,000	2,194,600	2,336,900	2,528,700	2,737,200	2,919,400	3,158,000	4.0	3.2	2.9	1.4	1.3
Total Non-Agricultural Emp.	812,900	1,080,500	1,609,000	2,142,400	2,711,500	2,793,800	3,025,000	3,254,000	3,448,800	3,706,700	3.5	2.9	2.4	1.1	1.2

1/ Significant break in series after 1990 due to reclassification of a portion of chemicals (SIC 2819) to commercial physical research (SIC 8731).
2/ Significant break in series in 1996 due to reclassification of a portion of Engineering Services (SIC 8711) to Sanitary Services (SIC4959).

Internal efficiencies and technological changes leading to productivity gains will serve to hold manufacturing employment growth in check. Some of the productivity gains will result from increasing competition in a world economy; others will be dictated by necessity – the need to adapt to a slowdown in labor force growth and to the uncertainties in the supply of raw materials. In either case, the drive for greater efficiencies will constrain overall employment increases in goods producing sectors (Figure 3-2). Thus, manufacturing employment in Washington is expected to increase only slightly over the next 25 years – about 0.4 percent per year for a total gain of 32,600 jobs over the entire period. The national economy, in contrast, is expected to lose manufacturing jobs throughout the forecast period.

Washington is expected to share the national outlook for slower growth in population and employment in the future. But contrary to the projected reductions in the U.S., manufacturing employment in the state is expected to grow slightly, owing to the concentration of export-oriented capital equipment production in Washington and to the state's accessibility to the rising Asian markets.

Figure 3-2
Manufacturing Employment Trends: Washington and U.S.



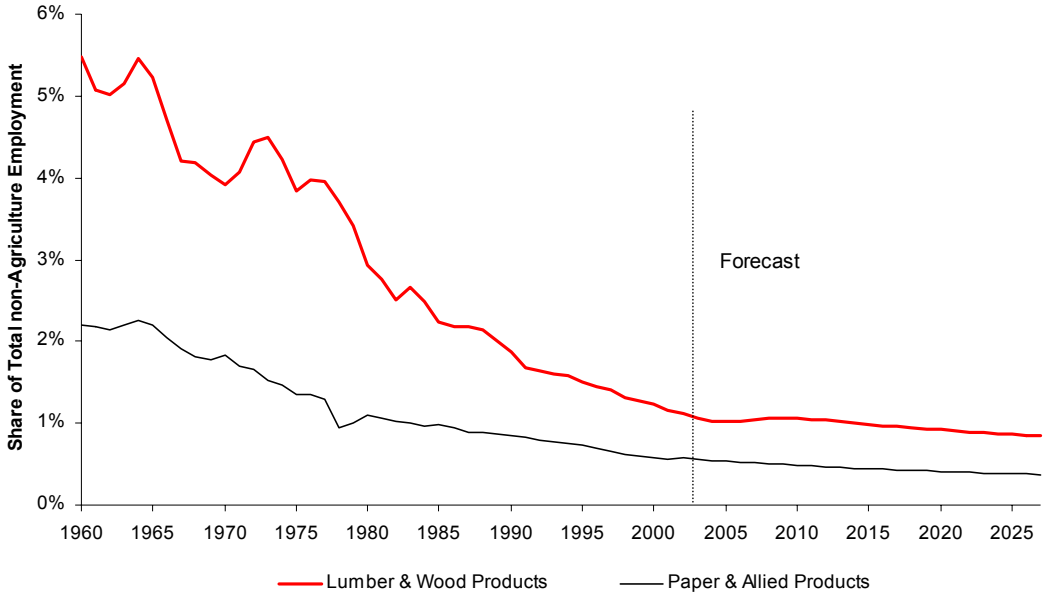
OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch **APRIL 2003**

The need for continuing capital investments is expected to accelerate through the next decade. Accordingly, growth in machinery and electrical/electronics equipment production will set the tempo for the expansion of Washington's manufacturing base. Aerospace employment has been in a down cycle, which began in the third quarter of 1998 and, after a pause in the first half of 2001, resumed job reductions. The current decline is expected to taper off by late 2004. Other manufacturing industries that are likely to experience employment reductions are: lumber and wood products, primary metals, food and kindred products, furniture and fixtures, and paper and allied products.

Lumber and Wood Products

Jobs in lumber and wood products are expected to decline slightly throughout most of the forecast period. This is basically a continuation of the long-term trend extending back to the end of World War II. In 1947, the lumber and wood products industry employed 58,800 workers, which accounted for 8.9 percent of all non-farm jobs and 34 percent of all manufacturing jobs in the state. In 2002, employment stood at 29,900 workers and the shares had fallen to 1.1 percent and 9.6 percent, respectively. By 2027, lumber employment is projected to total 31,200 workers, representing 0.8 percent of total non-agriculture jobs and 9.1 percent of manufacturing jobs in the state (Figure 3-3).

Figure 3-3
Share of Total Washington Non-Agricultural Employment: Lumber and Paper Industries



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch **APRIL 2003**

The structure of the industry has changed dramatically in the post-war period. As with other goods-producing sectors, greater worker productivity has been a major factor behind a shrinking lumber and wood products employment base. Increased mechanization and newer logging and milling technology have decreased the number of workers needed for production.

Over the last decade a significant shift occurred on the supply side. In the late-1980s, policies corresponding to a heightened demand for environmental and wildlife protection effectively removed a sizable portion of the region's available stock of lumber from production. Federally owned forests, managed by the U.S. Forest Service and the Bureau of Land Management, were the focus of legal and regulatory efforts to comply with the Endangered Species Act. These measures were designed to protect the habitat of the Northern Spotted Owl, the Marbled Murlett, and various species of salmon. Consequently, timber sales from the federal lands in the state have declined substantially, raising the costs of raw material for local sawmills and planing mills.

It is expected that lumber and wood products employment will continue to be affected by environmental constraints throughout the forecast period. These pressures are likely to force accelerated investment in resource-saving (i.e. making more out of the same amount of raw material) and labor-saving technology. Higher material costs and competition from both Canadian lumber producers and alternative building materials (e.g. steel and composites) will bring about unrelenting efforts to improve internal production efficiencies. These factors all point to a constrained demand for labor.

Paper and Allied Products

Employment in paper and allied products declined from 18,100 in 1990 to 15,200 in 2002, and is expected to dip slightly to 13,800 by 2027. In relative terms, the industry's employment share will drop from 0.6 percent of total non-agricultural wage and salary employment in 2002 to 0.4 percent in 2027. The industry is highly capital-intensive, and gains in productivity will enable output to climb while employment declines.

Many of the same forces affecting lumber and wood products apply to the pulp and paper industry. Environmental laws have significantly affected paper industry's production requirements, and limits in log harvesting and processing have affected the supply of raw materials. Indeed, these factors have contributed to several plant closures in the state during the past decade. To its advantage, the paper industry is somewhat more flexible than lumber in acquiring raw resources. Chips can be imported and recycled paper can be used. Many paper plants already process a significant amount of recycled materials.

A significant portion of the industry's production in Washington is exported. But rising competition from Asian and Canadian operators will provide a dampening effect on the future growth of this industry in the state. On the other hand, environmental demands may result in accelerated investment in resource-saving and pollution abatement technologies. Adoption of these technologies will enhance the industry's viability in the region.

Aerospace

Aerospace employment in Washington increased 42 percent from 79,800 in December 1995 to 113,400 in July 1998. However, by 2002 industry employment had fallen 33 percent to 75,900. Aerospace employment in the state is expected to further retrench over the forecast period as productivity gains and use of the production capacity in other states and nations more than offset output growth. Pressures are mounting on cost control, and on operating margins as Boeing competes head-on with Airbus Industries and other potential foreign producers.

Boeing had two major acquisitions in the 1990s. The first was the buyout of Rockwell International's aerospace and defense operations in 1996; and the second was a merger deal with McDonnell Douglas in 1997. Both significantly strengthen the company's defense and space businesses. In November 2000, Boeing created an Air Traffic Management Division, enacting on the company's diversifying strategy to enhance business stability and growth. In September 2002 the company moved its corporate headquarters to Chicago.

The prospect for long-term demand is bright. Boeing predicts that the world air traffic will grow at an average of 4.7 percent per year over the next two decades. The company thus envisions a worldwide demand of 23,500 new jets for the next 20 years, or 1,175 new planes per year. A third of the demand is expected to emanate from replacement aircrafts because of fuel inefficiency, excessive noise, or obsolescence. The remaining two thirds will be generated by new growth in air travel, particularly in the Asia-Pacific Rim area. A disproportionate amount of revenues will come from Asian carriers because of their growing demand for the more expensive two-aisle, long haul aircraft.

Prospects of aerospace employment in the state will be limited by several factors. One major factor is foreign competition, particularly from Airbus. In the medium to long term, potential competition may come from Russia and Japan. Even some Pacific Rim nations have been developing production capabilities of aircraft components and may present competition to the existing suppliers and subcontractors in Washington. The second factor is productivity and production costs. Facing the challenge of foreign competition, Boeing recognizes that it must keep on improving its workers' productivity and lowering total production cost. Productivity gains or shifting production to lower-cost non-Washington regions will adversely affect the employment prospect in the state. And, third, in order to gain new aircraft orders from foreign carriers, Boeing will likely continue to outsource certain components to manufacturers in the foreign carriers' home countries. Although the outsourcing practice appears to limit employment growth in Washington, it will also prevent the loss of market share (and jobs) to Airbus and other competitors.

Other Transportation Equipment

Other than aerospace, Washington's transportation equipment industry consists of shipbuilding, boat building, and manufacturing of vehicles (primarily heavy trucks and trailers). Each segment of this industry faces very different market forces and prospects. Construction of the cross-Sound ferryboats in the past few years represented a major revenue source for the shipbuilding industry in the state. Repealing of the motor vehicle excise tax I-695 in 2001 threatens the shipyard jobs as it forces the state ferry system to curtail services and building of new vessels. Fortunately, spin-off projects from the Navy's Everett Homeport is generating substantial overhaul and maintenance work now for local shipyards.

Luxury yachts and other pleasure craft have seen healthy business growth in the late 1990s and can be expected to move in tandem with the general economy. Sales of heavy trucks and trailers generally follow the prevailing economic and business conditions.

Primary Metals

Washington's primary metals industry is dominated by aluminum smelting and refining. The availability of cheap, abundant, and reliable electrical power that is essential in the electrolytic reduction process has long been a factor in siting aluminum plants in the region. Energy represents about 30 percent of aluminum production costs.

The region's aluminum producers enjoyed a distinct competitive advantage with respect to energy costs until a big electric rate increase in 1979. To remain competitive, the Bonneville

Power Administration (BPA) agreed to tie power rate changes to the prevailing world price of finished aluminum and to participate in new plant and equipment investments to enhance overall operating efficiencies. This largely restored the industry's competitive position during the subsequent periods of high demand.

Several unsettling factors affected the picture in the early 1990s. World production exceeded demand and sales were maintained only by international agreement to address weakened market conditions. Russia possesses a significant aluminum production capacity. The prices fell precipitously in 1992-93 as the very weak ruble and the deteriorated domestic demand caused Russia to flood the world market with cheap aluminum ingots. Demand strengthened in 1994-99 and some idled capacity was put back on line.

The price and availability of electricity will play against future aluminum production in Washington. As the regional economy grows, aluminum producers will see more competition for electricity use from residential, commercial, and other manufacturing consumers. In an evolving regime of energy deregulation, the electricity rates in the state will approach parity with those in other western states. The 2000-01 energy price hikes led to full or partial closings of all of Washington's smelters. How much of the closed production capacity will be brought back on line will depend upon a resolution to the energy situation and aluminum prices in the international market.

Actually, the increased competition for electricity has already been occurring. In late 1993, the BPA reduced by a quarter the amount of power available to aluminum producers and raised the price of electricity by 20 to 25 percent. In 1996, aluminum producers in the region negotiated a new contract with the BPA. The new agreement requires, for the next five years, the aluminum companies buy the BPA's electricity at fixed rates, but at the same time it allows the companies to purchase electricity from other suppliers.

Over the past decade-and-a-half the industry has made significant strides in increasing efficiencies and enhancing competitiveness. Demand for primary and fabricated mental should remain healthy, given the bullish outlook for both consumer and industrial durable products. But under the pressure of growing foreign competition and rising input costs, employment in the state is expected to decline.

Machinery and Instruments

Growth of Washington's machinery and instruments sector has been strong over the past 20 years, and will continue to show strength for the foreseeable future. Combined employment in electrical and non-electrical machinery and instruments manufacturing in the state has risen at a robust 5 percent average annual pace since 1970 – almost twice the pace of total employment growth. Of particular note has been the explosive growth in electronics, and scientific and medical instruments.

In 2002, machinery, equipments, and instruments industries in Washington employed 51,400 workers, accounting for 16.6 percent of total manufacturing jobs in the states. The forecast

predicts a 55 percent employment increase in these sectors between 2002 and 2027. By 2027, about 23 percent of the state manufacturing jobs will be in these industries.

Market adjustments in the semiconductor industry have brought about several restructurings in the past decade. But the demand for computer hardware is expected to remain strong throughout the forecast period: the need of businesses to increase productivity requires the application of computer technology and electronic devices as an integral part of the daily work environment; and the use of computers in schools and homes has also become commonplace.

The state's prospect for attracting and retaining high-technology manufacturing are likely to remain positive, given the critical mass already in existence and the thrust of state and local economic development efforts. Cases in point include the Intel research and development facility at DuPont, and the WaferTek plant at Camas, which opened in 1997.

Non-electrical machinery production is keyed largely to farm, construction, forest products, and other heavy industries. The outlook for this sector is nonetheless below that for the electrical machinery and electronics sectors. However, new and expanding markets in East Europe, Asia, and Central and South America are strong possibilities in the long run given the accelerating trend toward greater industrialization in these economies.

Food Processing

The diversity of Washington's food production is expected to continue. Major products in the state include frozen potatoes, apple juice, and processed seafood. In addition, roast coffee and coffee products are a growing segment. Increasing uses of mechanization, biotechnology, online telecommunication, global positioning systems, and remote sensing will characterize the changes in the industry's production and distribution processes over the long run. But in contrast to sharp declines projected nationally to 2027, employment in Washington's food processing sector is expected to decline moderately as the markets for the industry's products continue to expand, both domestically and overseas.

Crop production will drive the industry due to the importance of the state's fruit and vegetable harvests. Long-term prospects for processed fruits, vegetables, and specialty products look very strong. Some labor market and demographic trends are favorable to the demand for convenience foods: a growing number of households having two or more workers; more and more women working outside home; and elderly population (age 65 years and older) increasing at a rate more than twice that of the total population.

Foreign exports are assumed to constitute ever-larger proportions of total sales over the long run, for both fresh and processed products. Niche markets will play increasingly important roles, aided by the growing popularity of western style foods in the developing countries. The opening of economies in Asia to free trade will present additional opportunities for the expansion of export markets.

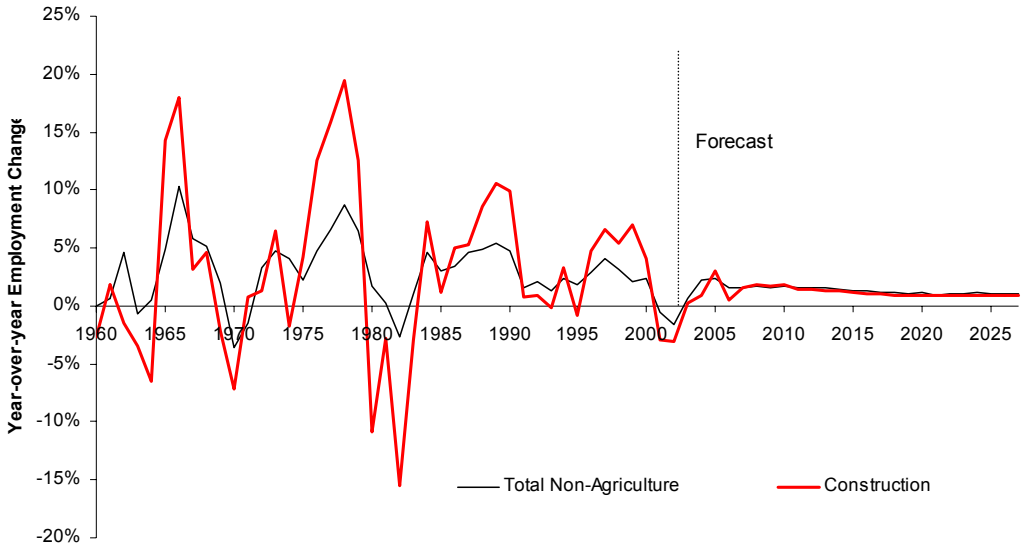
Construction

Historically, construction activity in the state has been very volatile. Short-term demand is sensitive to interest rates and the business cycle. In addition, large public works projects can exert a powerful short-term influence. In the long-term, however, the demand is primarily determined by construction costs, demographic changes, and employment growth. Population growth mainly affects the need for residential housing, whereas employment growth drives commercial buildings and non-building construction.

In spite of its many short-term ups and downs, the long-term average level of construction employment relative to total employment has actually been quite stable. Over the past 30 years, construction employment has been about 5.2 percent of total non-agricultural employment, with fluctuations occurring around this level during boom and bust periods. The lowest ratio of construction employment to total employment during the past 30 years was 4.7 percent, occurring on several occasions during economic slowdowns. The highest level of this ratio was 6.6 percent in 1979, when an economic boom was underway and the Washington Public Power Supply System had five nuclear power plants under construction. As of 2002, construction industry accounted for 5.7 percent of total non-farm employment, averaging 150,700 jobs. Construction activity in the 1980s was brisk, spurred by a surging investment in commercial projects (i.e., office, industrial, and retail space) and the booming housing market in the second half of the decade. As a result, average growth in Washington construction employment increased to 2.4 percent per year over the decade. Construction employment again rose at a 2.1 percent annual rate between 1990 and 2002, especially since 1995 when rising personal income and low interest rates stimulated housing activities.

However, the high rate of growth in the 1990s will not sustain in the long run. Throughout the

Figure 3-4
Relative Growth in Construction and Total Non-Agricultural Employment



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch APRIL 2003

forecast period population and employment growth is expected to gradually slow down, suggesting that job growth associated with both the residential and non-residential construction will be held at a slow rate. Some of the decline will be offset by rising incomes, which induce subsequent demand for more expensive housing and for remodeling/replacement. In addition, the prospects of low, stable long-term interest rates and inflation in the future would contribute to raising the levels of investment in residential and commercial buildings.

The future of the construction industry will also be shaped by technology changes -- telecommunication, teleconferencing, home and mobile offices, telecommuting, Internet shopping, and inventory management. These factors will significantly influence both the quantity and the types of building space demanded.

Taking into account all the positive and negative factors affecting the industry's future, the forecast suggests that construction employment level is likely to retain its share of overall employment. Construction employment as a share of total non-agricultural wage and salary employment will stay in the 5.5-6.0 percent range.

Service-Producing Employment

The relationship between goods-producing industries and service-producing sectors has changed substantially over the past 30 years. Increased productivity has slowed the pace of job growth in the goods-producing sectors, while heightened demand has accelerated job growth in consumer and business services, retail trade, and other non-manufacturing sectors. Also of note is that, over the past 15 years, there has been tremendous growth in professional and high-tech services employment in the state.

In 1960, non-goods producing sectors represented about two-thirds of total non-agricultural wage and salary employment. By 2002, the share had risen to 82.5 percent, and is expected to rise further in the forecast to 85 percent by 2027 (Table 3-3).

Transportation, Communication, and Utilities (T.C.U.)

Over the past 30 years, the share of total non-agricultural employment represented by T.C.U. has steadily declined from 6.7 percent in 1970 to 5.3 percent in 2002. Much of this is due to the increasing uses of advanced technologies in industries such as trucking, shipping, air transportation, and telecommunications. The technology advances have greatly increased capital intensity and labor productivity in these industries, making large output gains possible with a less corresponding increase in employment.

Telecommunication is the industry where most new products/services will be seen in the next decade. This occurs mainly as a result of the integration of voice, data, and video services through wired (copper, coaxial, or fiber optic cable) or wireless (radio waves, microwave, or satellites) networks. Almost every aspect of telecommunication services -- local exchange, cellular and Internet telephony, broadband networks, and global information flows -- will undergo paradigm shifts.

However, in the past few years the industry has invested heavily on building and expanding infrastructure. The "race" to be the first and fastest to build infrastructure in the absence of revenue generation and profitability has led to gross over-capacity, investor burnout, bankruptcies, and industry restructuring. It may take some time for the current unused capacity to be absorbed and then for the investment to revive.

The deregulation of most T.C.U. industries has resulted in higher operating efficiency and productivity gains. The forecast calls for the benefits of deregulation and further technological improvements, especially in communications, to sustain a healthy demand for the T.C.U. services. T.C.U. jobs as a share of total non-agricultural employment is expected to stay around 5.2 percent over the forecast period.

Wholesale Trade

Although the major business of wholesale sector is selling merchandise to retailers (or other wholesalers), wholesale trade employment has grown at a substantially slower rate than retail trade employment over the past 30 years. This reflects the adoption of productivity-enhancing technologies and improvements in business practices such as computerization, sophisticated inventory controls, and more efficient systems of distribution and delivery. Productivity and management improvements are expected to continue. Vertical integration in the past decade, as evidenced by the evolving warehouse/discount retailing, one-stop shopping, and specialty superstores has chipped away some employment growth in wholesale industry.

In 2002, wholesale trade employment in the state reached 138,200; it is predicted that the industry employment will grow at an average annual rate of 1.0 percent during the next two-and-a-half decades (Figure 3-5).

Retail Trade

Retail trade has increased its share of the state total employment over the past 30 years, primarily reflecting increases in income and spending power. During the 1960s and 1970s, growth of household income came from wage increases and rising female labor participation. In the 1980s, little or no growth of real wages occurred, but spending power still rose as a result of

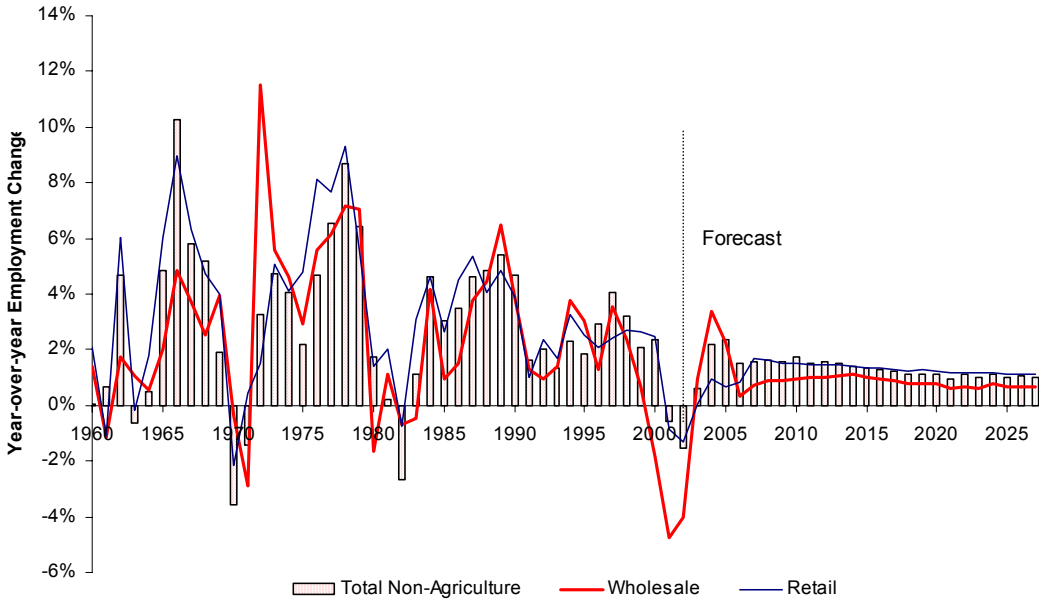
Table 3-3

Percent Share of Total Non-Agricultural Wage and Salary Employment by Industry

	Actual					Forecast				
	1960	**1970**	**1980**	**1990**	**2000**	**2005**	**2010**	**2015**	**2020**	**2027**
Manufacturing 1/	26.7%	22.2%	19.2%	17.2%	13.0%	10.6%	10.7%	10.2%	9.7%	9.2%
Non-durable Manufacturing	8.7	6.9	5.4	5.1	4.0	3.5	3.4	3.2	3.0	2.9
Foods & Kindred Products	3.3	2.7	2.0	1.8	1.5	1.3	1.2	1.1	1.0	1.0
Apparel Products	0.5	0.5	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2
Paper & Allied Products	2.2	1.8	1.1	0.8	0.6	0.5	0.5	0.4	0.4	0.4
Printing & Publishing	1.1	1.0	1.0	1.1	0.9	0.8	0.8	0.8	0.8	0.7
Chemical & Products 1/	1.3	0.5	0.5	0.6	0.2	0.2	0.2	0.2	0.2	0.2
Misc. Non-durables	0.3	0.3	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4
Durable Manufacturing	17.9	15.3	13.7	12.2	9.0	7.1	7.3	7.1	6.7	6.4
Lumber & Wood Products	5.5	3.9	2.9	1.9	1.2	1.0	1.1	1.0	0.9	0.8
Furniture & Fixtures	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Clay, Glass, Stone Products	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2
Primary Metals	1.3	1.3	1.0	0.6	0.4	0.2	0.2	0.2	0.1	0.1
Fabricated Metal Products	0.8	0.7	0.7	0.6	0.5	0.5	0.5	0.4	0.4	0.4
Non-Electrical Machinery	0.7	0.9	0.9	1.0	0.9	0.7	0.7	0.7	0.8	0.7
Electrical Machinery	0.3	0.4	0.7	0.5	0.7	0.6	0.7	0.8	0.8	0.8
Aircraft & Parts	7.1	5.7	4.9	5.4	3.2	2.3	2.4	2.3	2.1	1.9
Other Trans. Equipment	1.0	1.2	1.2	0.7	0.6	0.5	0.4	0.4	0.4	0.3
Instruments	---	---	---	0.7	0.5	0.5	0.5	0.5	0.5	0.6
Miscellaneous Mfg.	---	---	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
Mining	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Construction	5.5	4.9	5.8	5.5	5.9	5.6	5.6	5.5	5.5	5.4
Trans., Comm., & Utilities 2/	7.5	6.7	5.7	5.3	5.4	5.5	5.4	5.3	5.3	5.4
Wholesale Trade	6.6	6.0	6.3	6.0	5.6	5.3	5.1	5.0	4.9	4.8
Retail Trade	15.6	16.3	17.5	18.3	18.2	17.6	17.4	17.4	17.5	17.6
Finance, Ins, Real Estate	4.7	5.4	5.7	5.4	5.1	5.6	5.4	5.3	5.2	5.0
Services	12.7	15.7	19.2	23.5	28.8	30.8	31.7	32.8	33.4	34.2
Traded Services 1/	2.1	3.6	5.2	6.8	10.3	10.5	11.3	12.2	12.8	13.5
State & Local Government	14.3	17.3	16.3	15.1	15.3	16.3	16.1	16.1	16.2	16.3
Federal Government	6.2	5.4	4.2	3.4	2.6	2.6	2.5	2.3	2.2	2.0
Goods-Producing	32.4	27.3	25.2	22.9	19.1	16.4	16.4	15.9	15.4	14.8
Service-Producing	67.6	72.7	74.8	77.1	80.9	83.6	83.6	84.1	84.6	85.2
Total Non-Agricultural Emp.	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

1/ Significant break in series after 1990 due to reclassification of a portion of chemicals (SIC 2819) to commercial physical research (SIC 8731).
2/ Significant break in series in 1996 due to reclassification of a portion of Engineering Services (SIC 8711) to Sanitary Services (SIC4959).

Figure 3-5
Relative Growth in Trade and Total Non-Agricultural Employment



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch **APRIL 2003**

continued growth in the labor earnings of women. In addition to contributing to higher household income, increased women's participation in market labor reduced the time available for preparing meals at home, further fueling the business of eating and drinking establishments, the largest and fastest growing retail trade sector.

Factors affecting the retail employment forecast include the expectations that future wage increases will not match those of the 1960s and 1970s, and increases in total personal income will be slower in the next 25 years than was the case between 1970 and 2002 (see Chapter 4). In addition, since there are now already many women in the labor force, future increase in two-income households is expected to slow down.

Other trends in retail trade will also act to restrain its employment growth. Increasing worker productivity and economies of scale, as shown by warehouse-type superstores, will limit employment growth to some extent. Another uncertainty is the evolution of electronic shopping through the Internet. The effect of e-tailing is double-edged: it brings to Washington retailers, big and small, relatively easy access to national and even international markets; but at the same time it subjects local retailers to more competition from out-of-state retail operations. General merchandise retailers probably will be more affected by the evolution of e-tailing than those emphasizing specialty goods and services.

Taking into account the factors discussed above, the forecast calls for retail trade employment to continue rising, but at a slower rate than in the past. Consequently, retail trade's share of total wage and salary employment over the forecast years will remain in the 17.5-18.0 percent range.

Finance, Insurance, and Real Estate (F.I.R.E.)

Historically, employment in F.I.R.E. has grown slightly faster than total wage and salary employment, reflecting the growing population and rising real personal income. In the late 1980s and most of the 1990s, this trend was reversed due to the slowing population growth, overbuilding of commercial real estate, productivity improvements, mergers, and a shift toward electronic banking. Offsetting these negative factors were the inter-temporal booms in mortgage financing/refinancing and the expansion of financial services. The low and stable interests, accompanied by the prospering security markets, stimulated the growth in investment banking and brokerage businesses.

In the late 1990s, vigorous income growth and low mortgage interest rates gave rise to real estate financing activities. It also appeared that retrenchments and consolidations of the financial industry had quieted down. F.I.R.E. was the only private industry that did not suffer employment decline in the 2001 recession, due mainly to the lowering interest/mortgage rates and the soaring housing markets.

In the next two decades, aging of the population will raise the demand for F.I.R.E. services. This happens as the baby boom generation moves into the age cohorts that save a high proportion of their income, and as the elderly population with high assets ownership grow.

After 2002, employment in F.I.R.E. will increase at a slower rate than in the past. Computerization, electronic data exchanges, and other advances will raise the industry's labor productivity. The productivity gains will to some extent offset the need for more workers when the demand for F.I.R.E. services expands. Trends toward electronic banking, interstate banking, and the proliferation of smaller community banks are the uncertainty factors affecting job growth in these sectors.

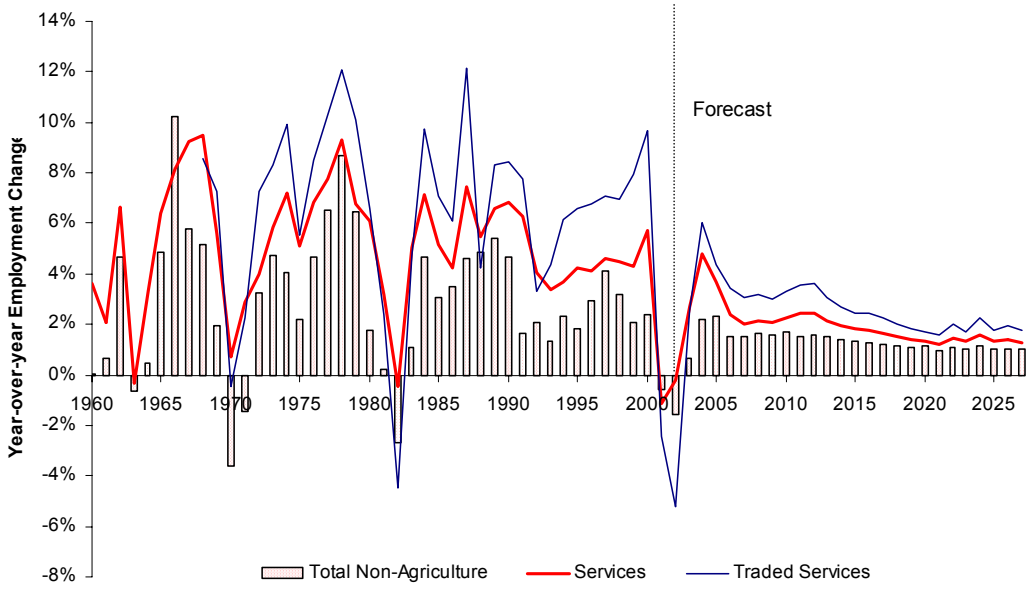
Services

Services have been the fastest growing industry division of the economy in recent years, and this is expected to continue during the forecast period. Services employment grew an average 5.2 percent per year in the past 30 years. In the future, services employment growth is expected to slow significantly to an annual rate of 2.7 percent from 2002 to 2010, and further slow to 1.7 percent per year through 2027 (Figure 3-6). However, services employment still remains the fastest growing sector throughout the forecast period. Its share of total wage and salary employment will grow from 29.1 percent in 2002 to 34.2 percent in 2027.

Traded services, including legal services, business services, engineering, management, and accounting services, represent more than one-third of total services employment. This group has been growing faster than the rest of the services division, and is predicted to lead this division in the future. By 2027, the traded services will have grown to 40 percent of all services employment. Growth in the traded services can be attributed to many factors, especially the trend toward increasing use of out-sourcing for some business operations. The ever-increasing complexity of the legal, human resource, marketing, information technology, and e-commerce fields has resulted in more and more firms out-sourcing these functions.

Another factor favoring the growth of business services has been the increasing use of temporary personnel to perform specialized tasks or to meet peak periods of demand. There has been rapid job growth at temporary help and employment agencies.

Figure 3-6
Employment Growth: Total Non-Agriculture, Services, and Traded Services



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch **APRIL 2003**

The growth of prepackaged software industry in the state has been phenomenal. A Washington company, Microsoft Corporation, is the largest firm in this industry. An impact study by Conway and Associates indicates that Microsoft was the state's seventh largest employer in 1995. According to the report, each of the almost 9,000 Microsoft jobs leads to 3.4 other jobs in the state. Including stock options, the average employee at Microsoft earned more than $138,000 in 1995. The company has been growing briskly, both domestically and in foreign markets. Although the same pace of growth will not last indefinitely, the company does plan to add as many qualified employees as they can find in the next few years. The rapid growth of high-wage jobs at Microsoft and other software development companies around the state has contributed to the growth as well as diversify of the state economy.

Although other services are not expected to grow as fast as traded services, they will continue to grow significantly faster than total employment. Health services employment has experienced fast growth in the past; future growth, however, is expected to be only slightly above average. Historical increases in health services jobs reflect an increasing commitment of society's resources to health care. Future increases in the proportion of national income spent on health care depend on such factors as aging of the population, cost pressures, and development of advanced treatment procedures and new drugs.

Personal and repair services will probably be the weakest of the service subsectors, while hotels, amusement and recreation, education, and social services will be relatively strong.

State and Local Government

Education is a major function of state and local government. State and local government employment grew faster than total employment between 1958 and 1972, as the Baby Boom generation moved through the educational system. Growth in the primary school age (i.e. age 5-17) population began to slow down in the second half of the 1990s; but the slowdown came at a time when growth in the college-age population (age 17-22) started picking up. The increase in the college-age population will lead to adding employment in higher education. This trend is enhanced by the evolving New Economy, whose information-intensive and productivity-driven growth requires a large amount of workers with post-secondary education.

Several factors are working together to slow down the growth of government employment. The first is passage of Initiative 601 in 1993, which ties the state government spending to the growth of total population and inflation. The second is a general sentiment across the nation that government has grown too large to be effectively managed, and thus the increasing practices of outsourcing government functions to private providers. Most of the growth in the combined "state and local government" sector is expected to occur on local government side.

Overall, the proportion of total wage and salary employment represented by state and local government is expected to remain flat over the next 25 years, despite the projected increases in the demand for public services.

Federal Government

Federal government employment has declined as a percentage of total employment throughout the post-World War II era. This trend is expected to continue; although some areas of federal government activity, such as the postal service and park service, are expected to increase along with the population. In the past few years, base closures in other states transferred military personnel to Washington; these shifts helped offset declines in other parts of federal civilian employment. In the future, federal government employment level in the state is expected to remain essentially unchanged.

Employment Diversity

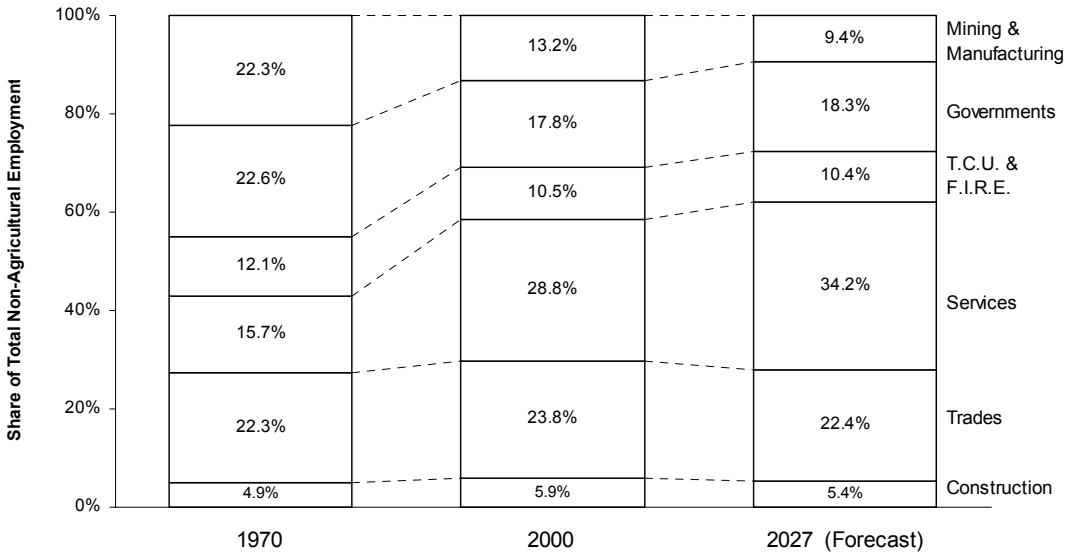
In 1960, manufacturing and government accounted for almost half of Washington's wage and salary employment. Manufacturing employment at that time was dominated by aerospace employment and lumber and wood products employment. These two sectors together accounted for almost half of manufacturing jobs and close to 13 percent of total wage and salary employment in the state. Government, excluding the armed forces, employed more than 20 percent of total wage and salary workers in the state. A third of government employment in 1960 was federal civilian workers, basically reflecting the strength and size of national defense-related establishments in Washington at that time.

For decades, the overall state economy moved in concert with the changes in its military, aerospace, and timber industries. Booms and busts of these industries likely would induce the same condition in the overall state economy. However, this relationship has changed substantially. Government still accounted for 19.4 percent of total wage and salary employment in 2002; the shrinkage in federal government, particularly in defense, was somewhat offset by increases in state and local government employment. Aerospace and timber industries now account for less than 5 percent of the state's non-farm employment. Manufacturing and government constituted less than one-third of total non-agricultural employment in 2002, compared to about one-half in 1960.

Manufacturing employment in the state is projected to grow significantly slower than total employment in the next 25 years. As a result, the manufacturing share of total non-agricultural employment is expected to decline from 11.7 percent in 2002 to 9.2 percent by 2027 (Figure 3-7). The forecast calls for a reduction in the employment share of lumber and wood products industry from 1.1 percent in 2002 to 0.8 percent in 2027. Also, the aerospace industry's share of total state employment is projected to decline from 2.9 percent in 2002 to 1.9 percent by 2027.

The fastest growing industry division of the Washington economy has been services. This reflects to a large degree the shift in consumption from goods to services, nationwide. The fastest-growing service sectors are business services, engineering, management and accounting services; all are components of traded services. The services division is expected to continue to gain employment share throughout the forecast period. By 2027, services will constitute about one-third of total wage and salary employment. That means services employment will be larger than manufacturing and government employment combined by the end of the forecast period.

Figure 3-7
Distribution of Washington Employment by Industry



T.C.U. = Transportation, Communication, and Utilities. F.I.R.E. = Finance, Insurance, and Real Estate.

OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division
EMPLOYMENT SECURITY DEPARTMENT, Labor Market and Economic Analysis Branch **APRIL 2003**

CHAPTER 4

Long-Term Forecast of Washington Personal Income

TRENDS IN WASHINGTON PERSONAL INCOME reflect the state's economic, labor force, and population growth. For private businesses, the size and composition of personal income provide a good measure of consumer demand and market potential. For governments, personal income is an important indicator for monitoring state economic conditions, anticipating tax revenues, and assessing the level of services required.

Per capita personal income is often used to assess the economic well being of the state residents. Trends in state per capita income reflect local economic changes, poverty status, business climate, standard of living, and the state's obligation and ability to finance the means-tested entitlement programs.

Total Personal Income Trends

In 2002, total personal income in Washington was $198.1 billion. After adjusting for inflation, total state personal income in 2002 was more than three times the 1970 level, increasing at an average annual rate of 3.7 percent over the past three decades. Total personal income in the state, inflation-adjusted, is projected to grow an average 3.2 percent a year between 2002 and 2027, a significant slowdown from the level that the state experienced in the past. The predicted slowdown in income growth reflects the expected lower increases in the state population and real per capita income. The latter roughly reflects the projected slowdown in labor force growth that will be only partially offset by the expected productivity increase.

Washington State in 2002 accounted for 2.2 percent of total personal income in the nation, a significant increase from the 1.7 percent share in 1970. The increased share results from the fact that the state economy and population have been expanding faster than the nation as a whole. In the future economic and population growth in the state is expected to be closer to that in the nation and, by 2027, about 2.4 percent of the nation's total personal income is forecasted to be in the state (Figure 4-1).

Personal income growth fluctuates with business cycles. Long-term speaking, personal income growth in Washington closely mirrors the national trend, but with more erratic and volatile short-term movements (Figure 4-2). Excluding the recession periods, the state personal income trends seem to have fluctuated within a range of two-to-four percent growth rate. In the future more stable income growth is expected due to the declining role of cyclical industries and the growing diversification of the state economy.

Figure 4-1
Total Personal Income: Washington, 1970-2027

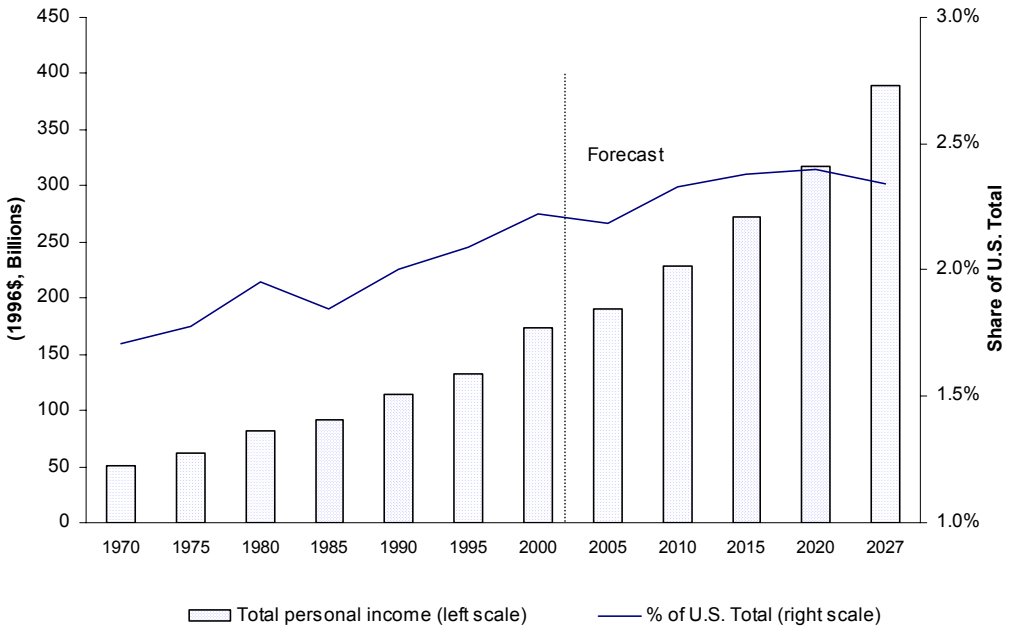
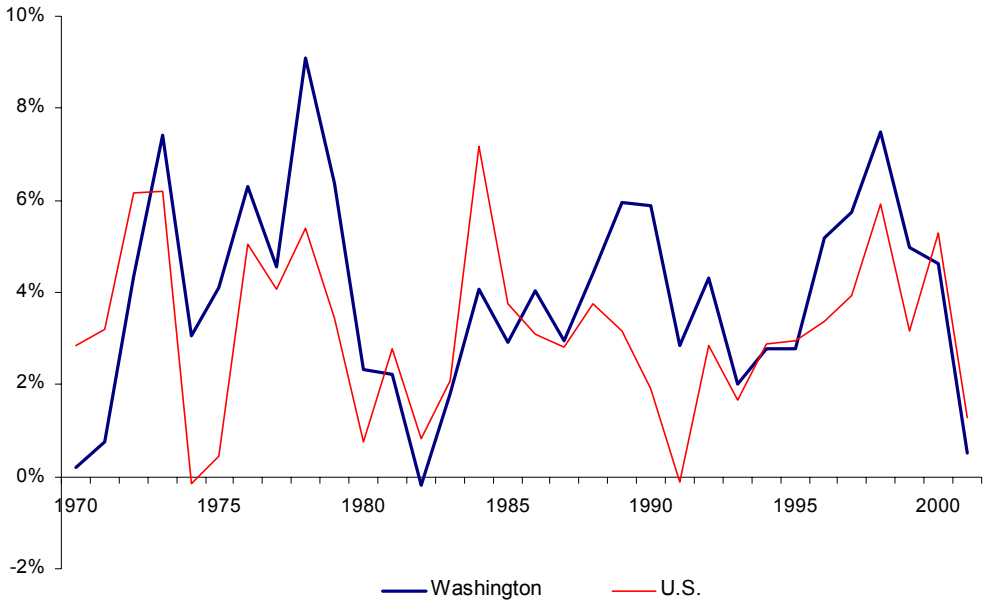


Figure 4-2
Annual Change in Total Real Personal Income



Income Growth by Component

Personal income, as defined by the Bureau of Economic Analysis, has three major components: (1) earnings (wages, other labor income, and proprietor's income); (2) dividends, interest, and rent; and (3) government transfer payments. In 2002, earnings accounted for 67 percent of total personal income in Washington; and dividends/interest/rent and transfer payments represented 19 and 14 percent of total personal income, respectively. These three income components have been growing at varying rates over the past three decades (Table 4-1).

- **Earnings.** Washington real total earnings (in 1996 constant dollars) tripled from 40.0 billion in 1970 to 126.1 billion in 2002. The average annual growth rate of earnings was 3.7 percent, slightly lower than the 4.0 percent rate for total personal income growth. Earnings growth is subject to cyclical factors; the annual rate of real earning growth in the state dipped to as low as -3.2 percent during the 1969-70 period, and rose to a high of 9.9 percent in 1977-78.

  In the first half of the 1990s, growth in total earnings in Washington significantly slowed. The 1.8 percent annual increase in 1993-95 was the lowest earnings growth the state has experienced since the 1982-83 recession period; cutbacks in the aerospace industry were the major culprit for the mediocre performance. The earnings growth then rebounded strongly to 6.8 percent per year in the 1995-99 period, but then slowed to 3.4 percent in 2000. Over the next two years, from 2000 to 2002, the estimated total earnings declined 0.4 percent as the recession hit.

Table 4-1
Real Income Growth by Component: Washington

	Average Annual Growth Rate (%)						
Income Components	1970-75	1975-80	1980-85	1985-90	1990-95	1995-02	1970-2002
Total Personal Income	3.9	5.7	2.2	4.6	2.9	4.3	4.0
Earnings	3.4	5.5	0.9	4.9	2.8	4.3	3.7
Dividends, Interest, and Rent	3.6	9.1	6.1	4.6	1.8	4.2	4.8
Transfer Payments	8.1	3.3	4.8	3.8	5.9	4.8	5.1

Earnings growth has also varied significantly among industries (Table 4-2). Total farm earnings in real terms has been flat since 1970, and its share of total earnings in the state declined from 3.2 percent in 1970 to 0.8 percent in 2001. Real earnings from manufacturing increased 90 percent, but its share of total earnings in the state declined slightly from 23 percent in 1970 to 20 percent in 1990, and to 14 percent in 2001.

Despite substantial job gains, retail and wholesale trade has shown only modest growth in earnings. Actually, retail and wholesale trade earnings as a share of total earnings declined from 17 percent in 1970 to 15 percent in 2001 -- a result of these sectors' slow wage growth. Real earnings from services industry increased nearly seven folds over the 1970-2001 period,

increasing at an annual rate of 6.4 percent -- far above the 3.8 percent growth rate for total earnings. Services cover a wide range of sectors and occupations. Earnings in services started accelerating in the second half of the 1980s, as more growth took place in the high-paying sectors of this industry such as business, health, and management and consulting services. In the second half of the 1990s, the strong economy, accompanied with soaring stock option earnings, raised the services industry's earnings growth to a 10 percent annual rate.

Since earnings are such a large proportion of total personal income, a special section at the end of this chapter is devoted to analyzing the sources of changes in average earnings over the past two decades.

Table 4-2
Growth in Real Earnings by Industry: Washington

	Average Annual Growth Rate (%)						
	1970-75	1975-80	1980-85	1985-90	1990-95	1995-01	1970-2001
Total Earnings	3.4	5.5	0.9	4.9	2.8	4.9	3.8
Farm	13.4	-7.9	-8.2	3.6	0.6	-3.9	-0.8
Manufacturing	1.7	6.9	-1.1	4.5	-1.1	1.8	2.1
T.C.U.	2.8	5.4	0.8	3.6	4.7	4.4	3.6
Wholesale & Retail	3.7	4.6	1.2	3.5	2.7	3.9	3.3
F.I.R.E.	1.2	8.5	0.5	6.9	5.4	7.1	4.9
Services	4.5	8.1	3.9	7.8	5.6	8.2	6.4

T.C.U.=Transportation, Communication, and Utilities. F.I.R.E.=Finance, Insurance & Real Estate.

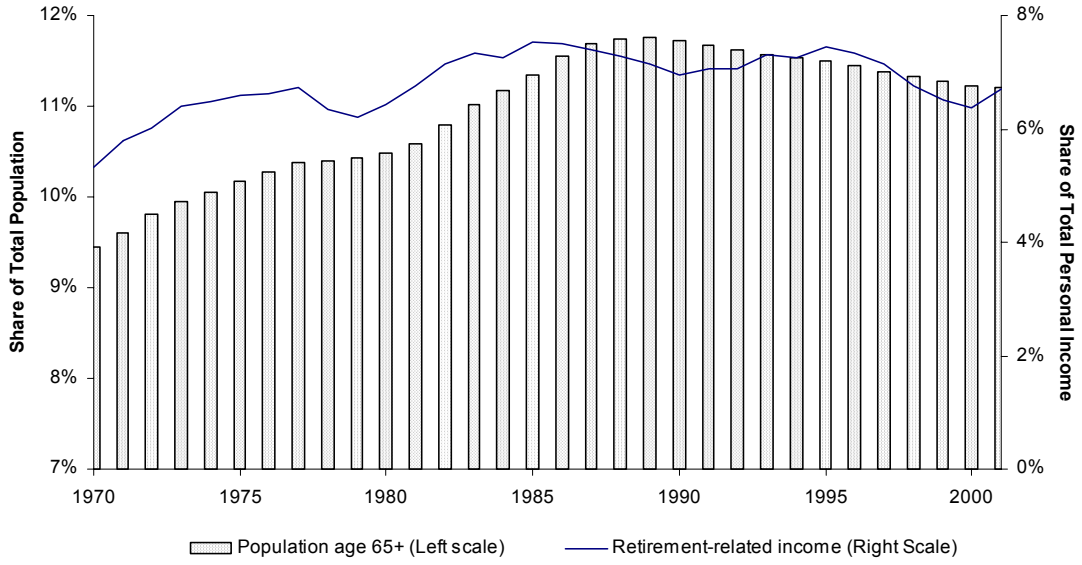
- **Dividends, interest, and rent.** The proportion of total personal income derived from property- and saving-related income sources increased steadily from 14.3 percent in 1970 to 18.6 percent in 2002. The share of income from these sources increased in the 1980s due in part to high interest rates early in the decade, and soaring property value in the second half of the decade. Between 1990 and 1995, real income from dividends, interest, and rent grew at an annual rate of 1.8 percent in the state, far lower than the long-term average of 4.8 percent. From 1995 to 2002, the growth rebounded to an annual rate of 4.2 percent.

  In the short term, income from dividends, interest, and rent is affected mainly by the monetary policies and cyclical conditions. Over the long run, it reflects past earnings and savings behavior. The future growth of this component of personal income thus depends on the state's success in retaining and attracting households with the ability and propensity to save and invest.

- **Transfer payments. T**ransfer payments as a source of personal income has become more and more important in the past three decades, increasing at an annual rate of 4.8 percent, significantly higher than the 4.0 percent annual growth for total personal income. The growth of transfer payments reflects the impact of the government policies dealing with social security, welfare, unemployment, and farm subsidies.

Retirement and disability insurance benefits and Medicare payments account for a large portion of the total transfer payments. The level of transfer payments is affected by the state's demographic profile (Figure 4-3) and relevant state and federal regulations. Aging of the population in the next few decades should contribute to the growth of this component of personal income.

Figure 4-3
Elderly Population and Retirement-Related Payments*



*** Includes government retirement and disability insurance benefit payments, and Medicare payments to individuals.**

OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division **APRIL 2003**

A significant portion of transfer payments is counter-cyclical in nature. In Washington, income derived from income maintenance and unemployment insurance benefit payments accounted for as high as 28.1 percent of total transfer payments during the cyclical trough in 1971, and as low as 12.9 percent in 1990 when the state economy peaked in the business cycle. In the 1990s, the share rose to 17.6 percent in 1993, then declined steadily to 12.4 percent in 2000, when the state economy reached its last cyclical peak. The share then rose to 13.3 percent in 2001

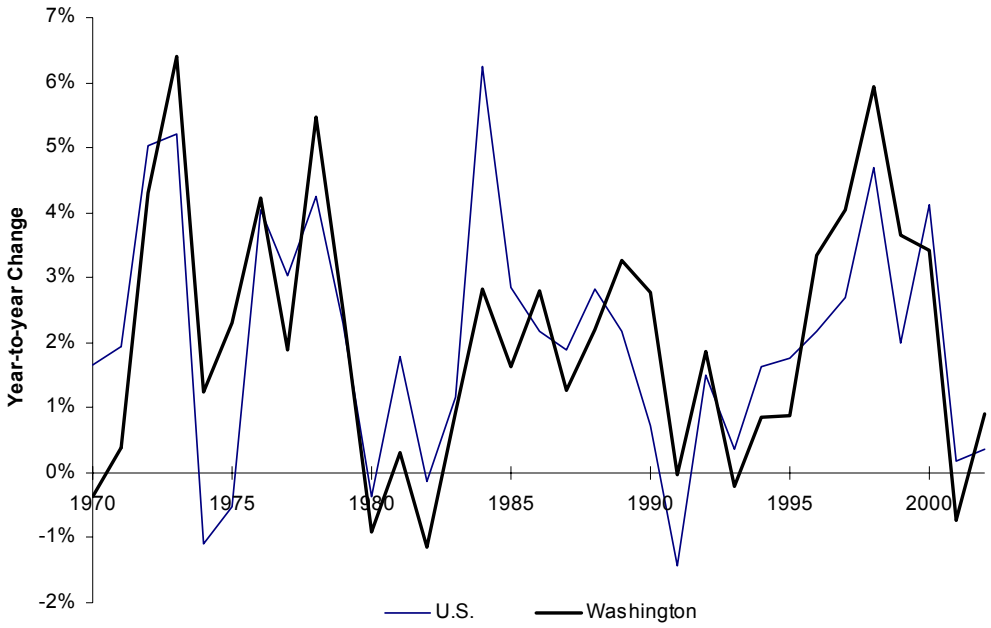
Per Capita Income Trends

Real per capita income is derived by dividing state total personal income by total population, then adjusted for inflation using the Implicit Price Deflator (IPD) for personal consumption from the National Income and Product Account (1996 = 1.0).

In 2002, real per capita personal income for the state was estimated at $29,417, which was more than 5 percent above the national average of $27,820. The state real per capita income in 2002 nearly doubled its level in 1970.

Between 1970 and 2002, Washington State real per capita personal income grew at an average annual rate of 2.1 percent. The growth did not follow a smooth path, but fluctuated along with the prevailing state economic conditions. During most of the expansionary periods, the state per capita personal income rose faster than the U.S. average. Conversely, per capita income growth in the state usually plummeted below the national trend during recessions or periods of slow economic growth (Figure 4-4).

Figure 4-4
Annual Changes in Real Per Capita Income



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division APRIL 2003

In the past, growth in the state's aerospace industry, along with the industry's high wages and salaries, played a major role in the growth of Washington personal income. This was evident during the 1965-70 period when real per capita income in the state increased nearly 4.5 percent per year. On the other hand, the 1980-82 national recessions were particularly hard on the Washington economy. The state economy was hit severely, resulting in a decline in real per capita income.

Since the late-1970s, growth in real per capita personal income has slowed, both in the state and the nation. The slowdown was more severe in the state than in the nation through most of the 1980s. However, since 1988 the state has gained some ground relative to the nation in per capita income growth.

Nationally, the most commonly cited reason for sluggish per capita income growth is the slowdown in productivity growth. This factor certainly also played a significant role in the earnings and income changes in the state. Besides, the state economy suffered from the collapse of non-oil commodity prices during the 1970s and the early 1980s that hurt its resource-based

industries. Other contributing factors include the appreciation of the dollar in relation to foreign currencies in the first half of the 1980s that hurt sales and employment in the state's export industries; the rise in real interest rates in the 1980s lowered demand for some Washington's durable goods products; the sudden termination of the Washington Public Power Supply System construction project and the loss of shipbuilding jobs in the early 1980s exerted large negative effects on the state earnings and personal income. By 1985, the state per capita income dropped below the national average.

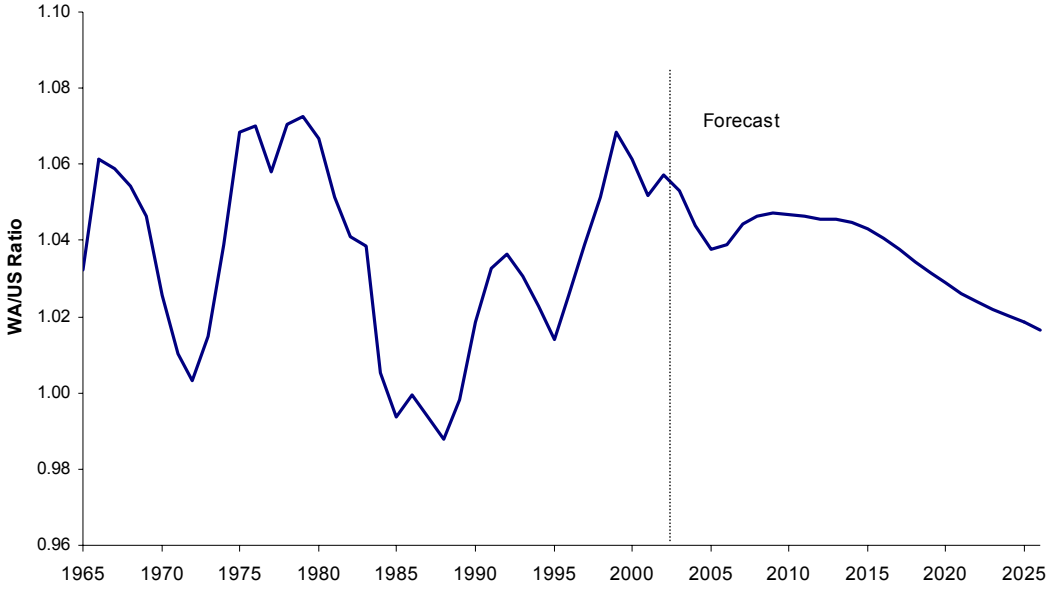
In the second half of the 1980s, Washington experienced substantial job gains in aerospace and high-tech manufacturing industries, along with a significant growth in the evolving high-wage "knowledge-based" service sectors. In addition, Washington's export industries were aided by a decline in the value of dollar relative to other currencies. As a result, real per capita income grew faster in the state than in the nation. In 1990, per capita income in the state rose to a level 1.8 percent above the national average.

The state's economy was at full strength in 1990 when the U.S. economy was entering into a recession. In 1991, the aerospace sector started cutting back production to accommodate a shrinking commercial aircraft market. The negative income effect of the aerospace reduction offset to a large extent the income growth brought about by other prospering sectors (e.g., machinery manufacturing and business services) in the state. Real per capita income growth in Washington thus slowed down in the early 1990s, but the nation as a whole suffered an even greater drop in income growth. Between 1993 and 1995, the Washington economy stalled due to on-going job reductions in aerospace, while at the same time the national economic recovery picked up pace. Per capita income growth in the state dropped below the national average during this period.

Economic growth in the state started accelerating in 1995. Strong national economic growth raised the demand for goods produced in the state. By 2000, job growth in Washington had been broad-based, covering many manufacturing and non-manufacturing sectors of the economy. Consequently, the state unemployment rate dipped to 5.2 percent, far below the average of 7.6 percent in the past three decades; and the employment-to-population ratio rose to a historic high. All of these have contributed to a big jump in per capita income growth. But the recession hit in early 2001 and real per capita income in the state dipped 0.7 percent from the previous year.

Over the long run, per capita income in Washington has trended closely with the national average. State per capita income averaged about 3 percent above the national level over the past three decades. However, the volatility of certain manufacturing and resource-based industries in the state periodically narrowed or widened the per capita income gap between Washington and the nation. In 1999, the state per capita income was 6.9 percent above the national average, a record high since the late 1970s (Figure 4-5). The gap narrowed somewhat to 5.7 percent in 2002.

Figure 4-5
Ratio of Washington to U.S. Per Capita Income



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division APRIL 2003

Outlook for Personal Income Growth in Washington

In the next 25 years, the Washington economy is expected to continue its diversification, with an industrial profile moving close to that of the nation. This development means that the state will likely experience more stable economic growth, thus less volatility in its personal income trends. But this also suggests that the states per capita income level is likely to converge to the national average in the future.

Long-term projections of state personal income suggest that Washington per capita personal income level will converge to but remain above the national average over the forecast horizon. Several factors contribute to the comparative strength of Washington's per capita income outlook:

- In the next two and a half decades, worldwide aircraft demand is expected to remain healthy. However, the trend of increasing out-sourcing of aerospace production in the state will sustain.
- Washington will maintain a relatively healthy manufacturing base. For example, agriculture and food products in the state will continue to benefit from the improving access to worldwide food markets; and these markets are expected to expand as a result of increasing consumption by rapidly growing Pacific Rim economies.

- The state's high wage durable goods and high-technology industries will benefit from the expected macroeconomic trends toward lower and more stable real interest rates, accompanied by increasing international demand for capital goods.
- A more integrated global economy will help expand state exports and stimulate export-related business activities. In addition, Washington has the geographic advantage that endows it with great potential to attract foreign investments.
- Recent business expansion and investment activities in the state suggest that the state has had the critical mass to continue attracting a variety of high-tech manufacturing and knowledge-based business service industries. The high wage jobs offered by these industries will help raise per capita income level.

The OFM per capita income projection model incorporates the above factors in its forecasting of per capita income growth in Washington.

Per Capita Income Growth Forecast

Between 1970 and 2002, real per capita income in the state grew at an average 2.1 percent per year. In the next 25 years, the growth will be slower at an annual pace of 1.9 percent (Figure 4-6). The projected lower growth rate is caused by the expected decline in labor force growth and lowering of the employment-to-population ratio, both resulting from an aging population. These negative factors are somewhat offset by the expected productivity growth. The same trends will prevail nationally.

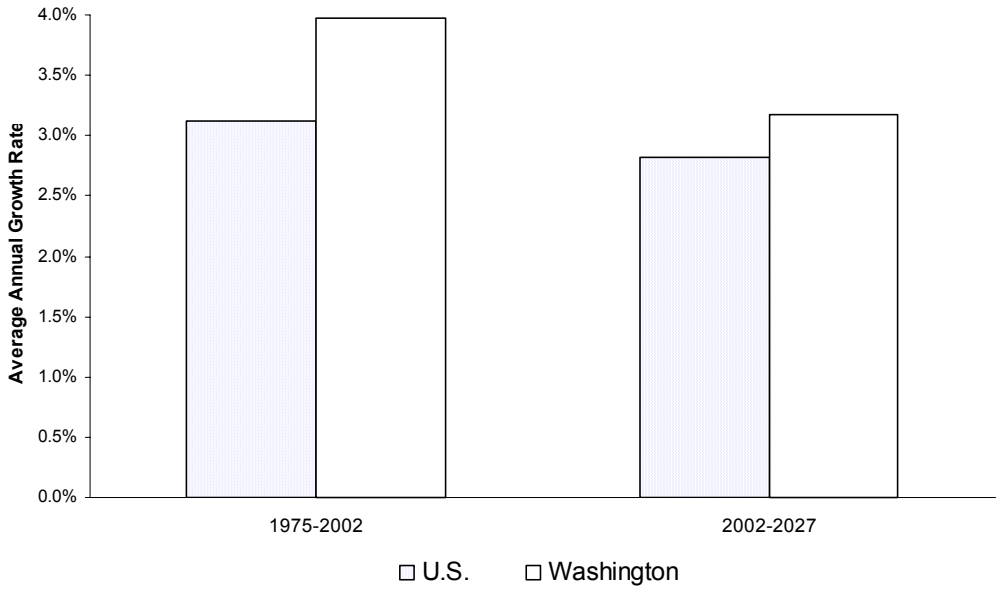
Table 4-3 shows the long-term personal income forecasts for Washington and the U.S.

Table 4-3

Personal Income Trends: Washington and U.S.

	Total Real Personal Income (1996 Dollars)				Per Capita Income (1996 Dollars)			
Year	Washington (Billions)	Annual Change (%)	U.S. (Billions)	Annual Change (%)	Washington	Annual Change (%)	U.S.	Annual Change (%)
1975	62.20	4.1	3,503.96	0.5	17,310	2.3	16,205	-0.5
1976	66.13	6.3	3,681.33	5.1	18,041	4.2	16,862	4.1
1977	69.14	4.6	3,831.24	4.1	18,382	1.9	17,372	3.0
1978	75.43	9.1	4,037.31	5.4	19,389	5.5	18,112	4.3
1979	80.23	6.4	4,176.74	3.5	19,875	2.5	18,530	2.3
1980	82.10	2.3	4,208.74	0.8	19,695	-0.9	18,461	-0.4
1981	83.91	2.2	4,326.04	2.8	19,758	0.3	18,789	1.8
1982	83.76	-0.2	4,361.45	0.8	19,533	-1.1	18,763	-0.1
1983	85.27	1.8	4,452.33	2.1	19,716	0.9	18,982	1.2
1984	88.75	4.1	4,771.81	7.2	20,274	2.8	20,166	6.2
1985	91.35	2.9	4,951.47	3.8	20,605	1.6	20,739	2.8
1986	95.04	4.0	5,105.29	3.1	21,182	2.8	21,191	2.2
1987	97.85	3.0	5,248.74	2.8	21,453	1.3	21,592	1.9
1988	102.16	4.4	5,446.77	3.8	21,928	2.2	22,202	2.8
1989	108.24	6.0	5,619.24	3.2	22,643	3.3	22,687	2.2
1990	114.60	5.9	5,726.10	1.9	23,270	2.8	22,850	0.7
1991	117.85	2.8	5,719.67	-0.1	23,262	0.0	22,523	-1.4
1996	122.93	4.3	5,883.13	2.9	23,694	1.9	22,859	1.5
1993	125.39	2.0	5,980.37	1.7	23,646	-0.2	22,940	0.4
1994	128.87	2.8	6,152.06	2.9	23,846	0.8	23,316	1.6
1995	132.46	2.8	6,334.05	3.0	24,054	0.9	23,725	1.8
1996	139.32	5.2	6,547.33	3.4	24,861	3.4	24,239	2.2
1997	147.34	5.8	6,804.86	3.9	25,865	4.0	24,891	2.7
1998	158.39	7.5	7,207.68	5.9	27,400	5.9	26,061	4.7
1999	166.28	5.0	7,435.16	3.2	28,401	3.7	26,579	2.0
2000	174.00	4.6	7,827.94	5.3	29,371	3.4	27,673	4.1
2001	174.92	0.5	7,927.30	1.3	29,154	-0.7	27,722	0.2
2002	178.35	2.0	8,039.50	1.4	29,417	0.9	27,821	0.4
Forecast								
2005	190.15		8,695.44		30,408		29,302	
2010	228.61		9,809.31		34,207		32,671	
2015	272.26		11,442.57		38,172		36,596	
2020	317.67		13,250.24		41,908		40,727	
2027	389.05		16,136.60		47,621		46,970	
	Average Annual Growth Rate (%)							
2000-2005	1.8		2.1		0.7		1.2	
2005-2010	3.8		2.4		2.4		2.2	
2010-2015	3.6		3.1		2.2		2.3	
2015-2020	3.1		3.0		1.9		2.2	
2020-2027	2.9		2.9		1.8		2.1	
1970-2000								

Figure 4-6
Growth of Real Total Personal Income



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division APRIL 2003

By 2027, real per capita income in Washington will rise to $47,600, about 62 percent above the 2002 level.

Combining per capita income increase with population growth, total state personal income is expected to more than double over the next 25 years, from $178 billion in 2002 to $389 billion in 2027 (1996 constant dollars). This represents an average annual growth rate of 3.2 percent during the forecast period, higher than the 2.8 percent rate projected for the nation. As a result, Washington's share of total national personal income increases from 2.2 percent in 2002 to 2.4 percent in 2027.

Special Analysis: Trends in Earnings

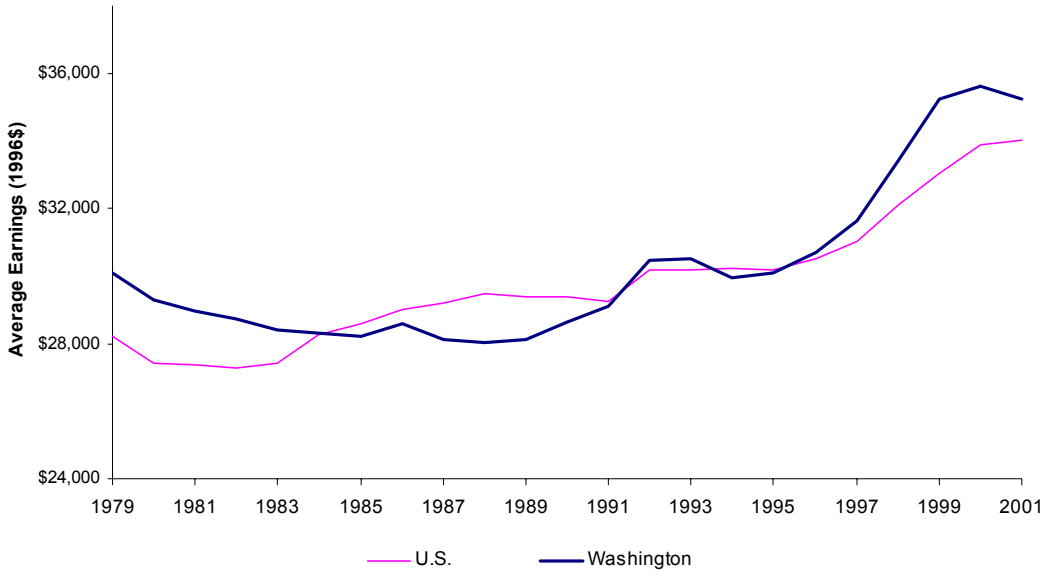
Earnings[1] account for more than two-thirds of total personal income. Changes in earnings thus set the tone for personal income growth. This section explores the sources of earnings changes in Washington over the past two decades.

[1] The earnings data are estimated by the Bureau of Economic Analysis, U.S. Department of Commerce. Earnings include wage and salary disbursements, other labor income, and proprietors' income. Other labor income consists of the employers' contributions to benefit plans for their employees such as pensions and profit-sharing plans, group health and life insurance, supplemental unemployment insurance, privately administered worker's compensation plans, directors' fees, and other miscellaneous fees. While this definition of earnings does not include the value of all non-wage benefits, it is a much broader definition of compensation than just wage and salary disbursements.

Changes in Real Average Earnings in Washington, 1979-98

Changes in real average earnings in the state have exhibited a different course than the national average. Between 1979 and 1988, the state real average earnings declined relative to the U.S., in 1988 the trend began to reverse. Washington gained significant ground in the second half of the 1990s and, by 2001, real average earnings in the state was about 4 percent above the national average (Figure 4-7).

Figure 4-7
Real Average Earnings: Washington vs. U.S.



OFFICE OF FINANCIAL MANAGEMENT, Forecasting Division APRIL 2003

In 1979, Washington real average annual earning in 1996 constant dollars was $30,072; but by 1988, real average earnings in the state dropped by $2,051 to $28,021. During the same period, real average earnings in the U.S. increased from $28,212 to $29,492. In percentage terms, Washington's real average earnings declined by 6.8 percent between 1979 and 1988, while the U.S. real average earnings rose 4.5 percent. Consequently, between 1979 and 1988, real average earnings in Washington changed from 6.6 percent above to 5.0 percent below the national average.

Since 1988, however, Washington's average earnings have grown faster than the U.S. average. In 2001, real average earnings in Washington rose to $35,248, representing a gain of $7,228 over the 1988 level. Real average earnings in the U.S. also increased during the period, but only by $4,514. From 1988 to 2001, the state real average earnings rose by 26 percent, compared to the much lower growth of 15 percent for the nation as a whole. The earnings recovery in the state was disrupted in the 1993-95 period; but starting in 1996, real earnings per worker in Washington again exceeded the national average.

The analysis below allocates changes in real average earnings into four components:

- **Industry composition** – Industry composition refers to how jobs are distributed among the industries of Washington or U.S. economy. Changes in industry composition affect average earnings because wage and earning levels vary among industries. A shift in employment from high-wage to low-wage industries affects aggregate average earnings.

  Over the last two decades both the state and the nation have seen a dramatic change in industry composition. In both economies there has been a shift away from high paying manufacturing jobs toward lower paying retail trade and services jobs. In the 1980s, this shift slowed down the growth of real average earnings in the U.S., but contributed to an actual decline in real average earnings in Washington.

- **Changes in real earnings within industries** – This component, by far, has been the most important contributor to the changes in Washington's real average earnings over the past two decades. Changes in real average earnings within industry sectors can be caused by a variety of factors including new technologies, more intensive uses of capital equipment, changes in organizational structures, unionization, labor force supply, product and market, or the cyclical performance of the regional, national, and international economies.

- **Incidence of part-time jobs** – Since average earnings are computed by dividing employment (with no regard to part-time or full-time status) into total earnings, an increase in the incidence of part time work would decrease average earnings. Part-time workers typically earn less than full-time workers in the same industry, due to fewer working hours and lower average wage rates. The fact that part-time workers often receive no or only partial non-wage benefits also lowers the earnings of part-time workers in relation to full-time workers. The percentage of part-time jobs relative to full-time jobs has been increasing steadily in the 1980s.

  Trends in part-time employment are also related to changes in industry composition. Manufacturing jobs tend to be full-time. A much higher proportion of jobs in services and retail trade are part-time jobs. The steady loss of high quality, "family wage" jobs has been accompanied by a rise in part-time employment. Many part-time jobs are held by the second wage earners in households. While the entry of secondary household wage earners may have contributed to raising household incomes, to some extent it has also been a response to the decline in real average earnings of primary workers in the households.

- **State versus nation factors** – In addition to the contributions of industry composition, growth in part-time jobs, and earnings changes within industries, this analysis also examines the relative contributions of state and national factors to changes in Washington's average earnings. For example, some changes in industry composition in Washington resulted from national forces affecting all states, while other changes were due to factors particular to Washington. Thus in the analysis, the "industry composition" component of the earnings change is further divided into changes due to national factors verses unique state conditions. A similar distinction is provided for the other two factors affecting real average earnings.

The method used to compute the components of earnings change is depicted in detail in Appendix A of this chapter.

Real Average Earnings Decline in Washington, 1979-88

Washington real average earnings decreased by $2,051 between 1979 and 1988. The contributions of each of the four components of change are shown in Table 4-4. The first component, the change in industry composition, is responsible for about 38 percent of the total change. As the breakdown between national and state factors indicates, the change in Washington industry composition was strongly influenced by national trends during this period. This reflects the fact that most of the employment growth in both Washington and the U.S. between 1979 and 1988 took place in the lower wage employment sectors such as services and retail trade.

Table 4-4
Washington Real Average Earnings*: Components of Change (1979-88)

	Change Resulting from			
	Industry Composition	Incidence of Part-Time Work	Average Earnings Within Industries	Total Change
State Factors	($16)	($330)	($2,867)	**($3,213)**
National Factors	($755)	$49	$1,868	**$1,162**
TOTAL	**($771)**	**($281)**	**($999)**	**($2,051)**

*In 1996 dollars.

The second component of change is the incidence of part-time work. There was a large difference in the growth rates of part-time work for Washington and the U.S. between 1979 and 1988. In 1979, Washington and the U.S. were fairly close in the incidence of part-time work; the proportion of Washington workers employed on a part-time basis represented 18.7 percent of total employment, and in the U.S. the proportion was 17.8 percent. Over the next ten years, the state's proportion of part-time employees increased more than the U.S average. By 1988, Washington had 20.5 percent of total employment in part-time jobs, significantly above the 18.6 percent share for the nation. However, as Table 4-4 indicates, this component had a relatively small effect on the change in real average earnings in the state, accounting for only about one-seventh of the 1979-88 decline in real average earnings in Washington.

The third and largest contributor to the earnings decline in the 1980s is the change in real average earnings within industries. Almost half of the decline in real average earnings in Washington could be attributed to this component of change. State factors made a very large negative contribution to this change, which was offset somewhat by positive national changes. From 1979 to 1988, real average earnings declined within virtually all sectors of the Washington economy.

Rebound in Washington Real Average Earnings, 1988-2001

The divergence of growth trends in real average earnings between the U.S. and Washington reached its maximum in 1988, since then the state experienced faster earning growth and the gap closed. Earnings growth in the state accelerated in the second half of the 1990s.

As Table 4-5 shows, by 2001 real average earnings in Washington had recovered much more than the ground lost in the 1980s. Changes in industry composition continued to have a significant negative contribution to average earnings during the period from 1988 to 2001. However, this negative effect of changing industrial composition on earnings growth was not unique for this state, but occurred nationwide.

Table 4-5
Washington Real Average Earnings*: Components of Change (1988-2001)

	Change Resulting from			
	Industry Composition	Incidence of Part-Time Work	Average Earnings Within Industries	Total Change
State Factors	$81	($181)	$3,815	**$3,715**
National Factors	($1,265)	$501	$4,275	**$3,511**
TOTAL	**($1,183)**	**$319**	**$8,089**	**$7,225**

*In 1996 dollars.

From 1988 to 2001, the incidence of part-time work in Washington decreased, but the decline was less than the national average. The change in the part-time working incidence produced a modest positive effect on real average earnings in the state.

As in the 1979-88 period, the biggest contributor to the change in Washington average earnings since 1988 was the earnings changes within industries. In a reversal of the trend from 1979 to 1988, real average earnings in Washington grew in most industrial sectors. Between 1988 and 2001, a $8,089 increase in Washington real average earnings was due to changes in this component. About half of this increase could be attributed to unique state conditions other than the effect of national trends.

Some Explanations for the Earnings Changes

There are many possible explanations of the causes for earnings changes. Analysis of the nationwide survey data and other more detailed information is required for a better understanding of the earnings changes in the state. However, based on aggregate level employment and earnings data presented here and other related observations at the national level, the following factors appear critical in affecting the earning changes:

- **National factors in the effect of industry composition –** Over the past 20 years, high-paying jobs were lost as many U.S. manufacturing industries failed to keep an edge over production advances occurring abroad. The spread of advanced mass production technologies to developing

or newly developed countries, together with the increased global mobility of capital, also resulted in a shift of some production to other countries.

Between 1979 and 1988, two monetary developments further eroded the base of high-paying production jobs. The enormous appreciation of the dollar value in the late 1970s and early 1980s made the cost of U.S. goods much higher abroad and the prices of foreign goods lower at home. In addition, high real interest rates in the U.S. discouraged domestic investment and depressed the demand for durable goods.

These circumstances exacerbated a long-term decline in manufacturing jobs due to increases in labor productivity. For example, by the late 1980s, Washington's lumber and wood products industry was producing the same amount of lumber as in the late 1970s, with about one-third fewer workers.

- **State factors in the effect of industry composition –** The negative effect of industry composition on average earnings in Washington merely mirrored a nationwide phenomenon. Still, some special circumstances had occurred in the state that either raised or depressed the earning levels. For example, the termination of Washington Public Power Supply System nuclear reactor construction resulted in the loss of thousands of high-skill, high-wage construction jobs in the early 1980s.
- **State factors in the 1979-88 earnings decline within industry sectors –** For many Washington industries, a large portion of their output is exported. The fortunes of these Washington industries depend heavily upon the markets outside the state. The state economy began the 1980s with relatively high wages and strong labor unions, but at the same time depending on several major manufacturing sectors that were increasingly subject to international competitive pressures. Also, in the 1980s, competitions from other regions of the country against major Washington sectors such as lumber, shipbuilding, and aluminum, placed additional downward pressure on wages in the state's export industries.

  Real average wages declined in nearly all sectors of the Washington economy during the 1980s. Productivity gains, which had boosted real wages in the 30 years after World War II, slowed down considerably in the 1970s and 1980s. International competition, exacerbated by a rising dollar, also forced businesses to reduce costs and hold down wages. Over time real wage declines in manufacturing and construction spread to services, retail, and other secondary sectors.
- **State factors in the 1988-2001 earnings rise within industry sectors –** Since the late 1980s, the employment profiles have changed for many major industries in Washington. High-skilled and high-paid occupations account for an increasing share of jobs in many industrial sectors. For example, in manufacturing, a growing proportion of jobs are professional technicians and engineers, outpacing the need for additional supporting staff (i.e., clerks and secretaries) and production/assembly line workers. Consequently, within-the-industry earnings have been rising rapidly and have contributed to a significant increase in aggregate average earnings in the state. In addition to the exceptional productivity gains, the soaring equity market in the second half of the 1990s had contributed substantially to the earnings of workers in the state's growing high-tech industries (namely, software, e-commerce, and biotechnology), where vested stock options comprise a major portion of employee compensation.

APPENDIX 4-A
DECOMPOSITION OF AVERAGE EARNINGS

	Change in Industry Composition	Change in Average Earnings Within Industries	Change in Incidence of Part-Time Work	Total Change
State Factors	Sc	Sw	Spt	Stot=Sc+Sw+Spt
National Factors	Nc	Nw	Npt	Ntot=Nc+Nw+Npt
Total	Ctot=Sc+Nc	Wtot=Sw+Nw	PTtot=Spt+Npt	CHtot=Ctot+Wtot+PTtot

Ctot =

Σ[AVEARNfte79 *SHARE79*EMPtot79* PTpct79*0.5] + [AVEARNfte79*SHARE79*EMPtot79*(1-PTpct79)*1.0]/EMPtot79 **-**
Σ[AVEARNfte79 ***SHARE88*EMPtot88*** PTpct79*0.5] + [AVEARNfte79***SHARE88*EMPtot88***(1-PTpct79)*1.0]/**EMPtot88**

Nc =

Σ[AVEARNfte79 *SHARE79*EMPtot79* PTpct79*0.5] + [AVEARNfte79*SHARE79*EMPtot79*(1-PTpct79)*1.0]/EMPtot79
Σ[AVEARNfte79 ***NSHARE88*EMPtot88*** PTpct79*0.5] + [AVEARNfte79***NSHARE88*EMPtot88***(1-PTpct79)*1.0]/**EMPtot88**

Sc = Ctot-Nc

Wtot =

Σ[AVEARNfte79 *SHARE79*EMPtot79* PTpct79*0.5] + [AVEARNfte79*SHARE79*EMPtot79*(1-PTpct79)*1.0]/EMPtot79 **-**
Σ[**AVEARNfte88** *SHARE79***EMPtot88*** PTpct79*0.5] + [**AVEARNfte88***SHARE79***EMPtot88***(1-PTpct79)*1.0]/**EMPtot88**

Nw =

Σ[AVEARNfte79 *SHARE79*EMPtot79* PTpct79*0.5] + [AVEARNfte79*SHARE79*EMPtot79*(1-PTpct79)*1.0]/EMPtot79
Σ[**NAVEARNfte88** *SHARE79***EMPtot88*** PTpct79*0.5] + [**NAVEARNfte88***SHARE79***EMPtot88***(1-PTpct79)*1.0]/**EMPtot88**

Sw = Wtot-Nw

PTtot =

Σ[AVEARNfte79 *SHARE79*EMPtot79* PTpct79*0.5] + [AVEARNfte79*SHARE79*EMPtot79*(1 PTpct79)*1.0]/EMPtot79 **-**
Σ[AVEARNfte79 *SHARE79***EMPtot88* PTpct88***0.5] + [AVEARNfte79*SHARE79***EMPtot88***(**1-PTpct88**)*1.0]/**EMPtot88**

Npt =

Σ[AVEARNfte79 *SHARE79*EMPtot79* PTpct79*0.5] + [AVEARNfte79*SHARE79*EMPtot79*(1-PTpct79)*1.0]/EMPtot79
Σ[AVEARNfte79 *SHARE79***EMPtot88*NPTpct88***0.5] + [AVEARNfte79*SHARE79***EMPtot88***(1-**NPTpct88**)*1.0]/**EMPtot88**

Spt = PTtot-Npt